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THE

Journal of the Society of Arts,

AND OF

THE INSTITUTIONS IN UNION.

115TH SESSION.]

FRIDAY, NOVEMBER 27, 1868.

[No. 836. Vol. XVII.]

Announcements by the Council.

ORDINARY MEETINGS.

Wednesday Evenings at eight o'clock :—

DECEMBER 2.—“Further Notes on the Productive Industries of Natal.” By Dr. MANN, Superintendent of Education and Special Commissioner for the Colony.

DECEMBER 9.—“On the Drying Properties of various kinds of House Paint.” By CHAS. TOMLINSON, Esq., F.R.S., F.C.S.

DECEMBER 16.—“On Artificial Freezing.” By Dr. B. H. PAUL.

DECEMBER 23.—“Description of the Electric Organ.” By HENRY BRYCESON, Esq.

CANTOR LECTURES.

The first Course of Cantor Lectures for the ensuing Session will be “On the Aniline or Coal Tar Colours,” by W. H. PERKIN, Esq., F.R.S., and will consist of three Lectures, to be delivered on Monday evenings, as follows :—

LECTURE I.—MONDAY, DECEMBER 7TH.

Coal Tar, Benzol, Nitrobenzol, Aniline, and Aniline Purple or Mauve.

Coal-tar: its formation and constitution—Aniline a constituent of coal-tar—History of aniline—Discovery of aniline purple—Benzol: its properties, and separation from coal-tar—Nitrobenzol—Manufacture of nitrobenzol and aniline—Preparation of aniline purple, or mauve.

LECTURE II.—MONDAY, DECEMBER 14TH.

Mauve, Magenta, and some of their Derivatives.

Chemical nature of mauve—Runge's blue—Magenta: its discovery and manufacture—Phosphine—Bleu de Lyon—Bleu de Paris—Violet Imperial—Hofmann's violets—Britannia violets.

LECTURE III.—MONDAY, DECEMBER 21ST.

Various Aniline, Phenol, and Naphthalin Colours—Application of the Coal Tar Colours to the Arts.

Aldehyd green—Iodine green—Perkin's green—Aniline pink—Black, browns, &c.—Phenol—Picric and isopurpuric acids—Aurine, coralline, and azuline—Naphthalin yellow—Chloroxynaphthalic acid, &c.—Application of the coal-tar colours to the arts of dyeing and printing—Paper staining and colouring—Lithographic and other printing.—Conclusion.

Each lecture will begin at eight o'clock. These Lectures are open to Members, each of whom

has the privilege of introducing two friends to each Lecture. Tickets for this purpose will be forwarded with next week's *Journal*.

Other courses are being arranged, particulars of which will be announced.

INSTITUTIONS.

The following Institution has been received into Union since the last announcement :—

Weston-super-Mare, Albert Night School and Industrial Institution.

SUBSCRIPTIONS.

The Michaelmas subscriptions are due, and should be forwarded by cheque or Post-office order, crossed “Coutts and Co.,” and made payable to Mr. Samuel Thomas Davenport, Financial Officer.

Proceedings of the Society.

FIRST ORDINARY MEETING.

Monday, November 23rd, 1868; Lord HENRY GORDON LENNOX, M.P., Chairman of the Council, in the chair.

The following candidates were proposed for election as members of the Society :—

Arkwright, John H., Hampton-court, Leominster.

Ashby, John, Staines, Middlesex.

Aubert, William, 96, Strand, W.C.

Baily, Farmer, Hall-place, Tunbridge.

Botfield, W. B. Garnett, Windham Club, St. James's-square, S.W., and Decker Hill, Shiffnal.

Briscoe, John Ivatt, Fox-hills, near Chertsey.

Burr, Daniel Higford Davall, Aldermaston-court, Reading.

Clarke, Henry, 6, Regent's-park-villas, N.W.

Coleman, Alfred, 13, St. Mary-at-hill, E.C.

Courthorpe, George C., Whiligh, Hurst-green, Sussex.

Davidson, Elias A., 29, Clarendon-gardens, Maida-hill, W.

Davis, William, 208, Euston-road, N.W.

Day, John B., Savoy Steam Press, 3, Savoy-street, Strand, W.C.

Denison, Colonel Sir William, K.C.B., F.R.S., Observatory, East Sheen.

Drummond, George James, 11, Wilton-crescent, S.W.

Dunmore, Edward, 81, Malden-road, N.W.

Ellis, Benjamin Trapp, 17, London-road, Croydon.

Erle, Rt. Hon. Sir William, Bramshott-grange, Liphook, Hants, and 12, Princes-gardens, W.

Fernie, Kirwin J., Chaise-lodge, Hendon, and Union Club, S.W.
 Fielder, C. H., 30, Moorgate-street, E.C.
 Frost, Meadows, St. John's-house, Chester.
 Gibson, William, Percy-villas, Maple-road, Penge.
 Harrison, Charles, J.F., Stourport, Worcestershire.
 Hollis, Alfred Henry, 14, Highbury-place, N.
 Hopkinson, William Lander, M.D., St. Martin's, Stamford.
 Horner, Rev. John S. H., Mells Rectory, Frome.
 Kearns, H. W., 4, Granville-terrace, Jeffries-road, Clapham, S.W.
 King-Harman, Hon. Laurence Harman, New Castle, Ballymahon, Ireland.
 Jesse, John Fairfax, Llanbedr Hall, Ruthin, N. Wales.
 Johnston, Thomas, 12, Camden-place, Bath.
 Mast, Christian, Belgrave College, Pimlico, S.W.
 Murdoch, George B., 14, Walbrook, E.C.
 Nevile, Ralph Henry Christopher, 20, Jesus-lane, Cambridge.
 Oakes, Thomas Haden, Riddings, Alfreton.
 Pearce, Charles Thomas, M.D., 28 Maddox-street, W.
 Perkin, W. H., Seymour-villa, Sudbury, N.W.
 Peter, John Thomas Henry, Chyverton, near Truro.
 Rait, George, 238 Kingsland-road, N.E.
 Reeve, William, 40, Cambridge-terrace, W.
 Rodd, Francis, Trebartha-hall, Launceston, Cornwall.
 Rowley, Rev. W. W., M.A., Coombe-lodge, Weston-super-Mare.
 Tayler, Henry Joseph, Collegiate School, Glastonbury.
 Taylor, James, J.P., Culverlands, near Reading.
 Thomas, W., Cwmaman Collieries, Aberdare.
 Simms, William Hawes, 21, Thurloe-place, S.W.
 Stephens, John, Leytonstone, Essex.
 Wade, Thomas, Stonehouse, Plymouth.
 Weston, Rev. Henry Austin, Long Preston, Leeds.
 Windle, Hattam, 5, Princes-street, E.C.
 Wheatley, John Hewitt, Abbey-view, Sligo, Ireland.
 Wood, F. C., 483, Oxford-street, W.C.
 Woodd, Basil George, Hillfield, Hampstead, N.W.

The CHAIRMAN delivered the following
 ADDRESS.

LADIES AND GENTLEMEN,—Conscious of my own deficiencies, I regret very much that I should appear before you as Chairman of the Council of this important Society. I can assure you that the honour which I thus bear was of no seeking on my part, and it was not until I had been assured that my services would be acceptable to the Council, and might be of advantage to the Society, that I agreed to undertake a post for which I feel that there are many better fitted. My time is much occupied, not simply by my duties as Secretary to the Admiralty—though it is not for me to say how long I may continue to fill that office—but also by my parliamentary duties, which, I am thankful to think, I shall continue to discharge for some time to come. Having so many occupations which may trench very largely on my time, I did feel very doubtful whether I was the proper person to occupy the chair of your Council; but the earnest desire expressed by His Royal Highness the Prince of Wales, our President—whom I consulted upon the subject, and who takes a deep interest in the welfare of the Society—that I should accede to the wish of the Council, decided me to accept the office, and to do my best to

discharge its duties satisfactorily. I have, however, on this the first occasion of appearing before you in my present capacity, a double appeal to make to your forbearance—in the first place, on account of my official duties; and, secondly, because I have so recently emerged from a very hard-fought battle that I have not had even time to write my address, as is usual on these occasions, and must trust to my notes and your forbearance. For several weeks past I have been engaged in the contest I allude to from ten o'clock in the morning until six in the evening, in the streets, with the electors, and again from eight until a late hour, in addressing populous meetings; and, therefore, as it has been physically impossible for me to write my address, I must trust to your kindness to fill up any shortcomings you may discover.

My first duty this evening, as that of my predecessors on every occasion at an inaugural meeting, is a melancholy one, that of referring to those whom, during the last year, the Society has lost. The first and greatest name which meets me, is that of the Very Rev. the Dean of St. Paul's. Dean Milman was a scholar and a man of letters, his works extending over a very long period of his life. If I mistake not, one of his works, "The Fall of Jerusalem," was published more than forty years ago. His greatest work was his "History of Latin Christianity;" and one of his latest efforts was in 1862, when, although then far advanced in years, he addressed the annual meeting of the Association for the Promotion of Social Science, on the subject of education. Still more recently, however, he wrote the memoir of Lord Macaulay, which forms the preface to the popular edition of that distinguished man's history, and this biographical sketch, brief though it be, is, I believe, well worthy of his name. Dean Milman's connection with this Society arose from his co-operating with us many years ago in a movement for erecting a monument to the memory of Caxton, in the vicinity of Westminster Abbey, the Dean being at that time Rector of St. Margaret's. Ever since that time he took a deep interest in the operations of the Society, particularly those in the art department, but, from his advancing age, he was unable to take a prominent part in our proceedings. I cannot conclude these remarks more appropriately than in the words of the *Times*—"With Dean Milman—scholar, poet, historian, and divine in one—has passed away one of the last links which joined the scholarship of the 18th century with that of the present."

The next gentleman whose death we have to deplore is one whom I myself cannot allude to without considerable feeling, and I think there is no one who is in the habit of attending our meetings but must feel deeply the loss of Mr.

Harry Chester. He was mainly known to the public in connection with this Society from his efforts to affiliate with the Society of Arts the various literary societies and Mechanics' Institutions throughout the kingdom—a movement which proved thoroughly successful, and out of which grew the Society's system of examinations, the arrangements for which, as at present conducted, were the work of Mr. Chester himself. The great success of this system is sufficiently evinced by the fact that, while, in 1856, only 52 candidates presented themselves for examination, in the past year the number approached 2,000. Mr. Chester was also mainly instrumental in bringing about the Exhibition of Educational Appliances, which was held, in 1854, at St. Martin's Hall, and to his more recent exertions was in great measure due the establishment of the Food Committee, which has obtained and disseminated so much useful information. Mr. Chester and myself were educated at the same school—Westminster—and, I need hardly say, were on terms of the greatest cordiality. He was most constant in his attendance at our meetings, was possessed of the most genial and kindly temperament, and his every act was marked by the most entire absence of self-seeking. I cannot help thinking, gentlemen, that amongst those assembled here this evening, and especially amongst my colleagues at the Council board, there must be many who, on this opening night of another session, feel that their eye involuntarily wanders in search of a familiar face, and who cannot but be conscious that both the Society and themselves have sustained a heavy loss, when they miss the genial, kindly countenance of our lamented and beloved colleague, Harry Chester.

The only other distinguished man whose death I have to mention was not a member of our Society, but, as during the last few years we have made such great efforts in the way of musical education, it is impossible to omit a passing tribute to the memory of the great Rossini, who was laid in his grave only the day before yesterday. His works you all know, but it is rather a remarkable circumstance, which may have been forgotten by many present, that his greatest work, which is now become almost a household word, *Il Barbiere di Siviglia*, narrowly escaped utter condemnation the first night it was produced before a critical audience. His *Semiramide* you all know, and also how his favourite pupil, Alboni, performed the part of "Arsace," to the delight of a London audience. The Italian government offered to place the remains of the great master in the Italian Westminster Abbey, at Florence, as one of the greatest of her sons, but his relations preferred that where the tree fell there it should lie, and with a funeral service performed by all the great musical celebrities of the day—Alboni,

Gardoni, Patti, Nilsson—Rossini was laid in the grave to the music of strains he had himself composed, the *Stabat Mater*, *Mose in Egitto*, and other great works which have made his name immortal.

Gentlemen, I think my province this evening is to give you something in the nature of a Queen's speech, only I hope that it will not be followed by a vote of want of confidence. It is my duty to sketch for you in outline the operations of the Society, to run over in retrospect what has been done, and, as far as I can, to suggest what we may do in furtherance of the cause which we all have at heart. First, I may allude to the Artistic Copyright Bill, drawn up by the Council, which it is intended to again introduce during the coming Session. You are all aware that it was last year introduced by Lord Westbury, but owing to circumstances, which I need not further allude to, it did not pass into law. I believe there is no one belonging to this Society who does not entirely approve of the objects of that bill, which is to supplement the Act of 1862, also the work of this Society, and by consolidating and amending the laws of artistic copyright generally, to bring this branch of the law into one consistent whole, worthy of the nation, and more in harmony with the laws which regulate this subject in foreign countries. It must also be borne in mind that it is not ourselves only who are concerned in this matter, but also various foreign states, at present thirteen in number, with whom we have conventions for international copyright, and who feel deeply the present defective state of our artistic copyright law.

The next matter which I have to bring before your notice is our system of giving prizes to competitors in Art Workmanship. To me, this is one of the most interesting of the Society's operations. I always attend the exhibitions, and my principal regret, is that they are not more widely known outside the circle of our members. This year the conditions of the prizes have been somewhat altered, and I think with advantage. Hitherto the system has been to require copies only of choice models of ancient art, but this year the competitors are to be allowed, so to speak, to run alone, and are to have more scope for the display of their own talent or genius. I think this is a step in the right direction, and that it was time we left the groove in which we had been running, although it is not for me to say whether, after a time, it may not be advisable to return to the study of the *chefs-d'œuvre* of the old masters. In painting, for example, a copyist, however successful he may be in the reproduction of a work by an old master, is but a copyist still; and so with the workmen whom, year by year, we have invited to compete at our exhibitions; they

have reproduced as nearly as they could the models we gave them, but nothing more. Now, gentlemen, we have issued new regulations and conditions, under which, if there is any creative genius, and doubtless there will be amongst them, it will be able to show itself, and we shall admire it even more than mere mechanical dexterity in producing beautiful effects. In our great International Exhibitions one cannot help admiring the magnificent specimens of Art-workmanship which are exhibited by leading English and foreign firms; but I, for one, feel a much deeper interest in these exhibitions of ours, because we are there brought face to face, so to speak, with the very men who have produced the work which is exciting our admiration. I cannot say that I approve of all the applications of artistic workmanship for which prizes are offered. For instance, I think the ladies present will agree with me that pianoforte keys will not be much improved for practical musical purposes by being elaborately ornamented, but that is a minor consideration. The main principle is, that these men having been educated for years in the study of objects of art, are now expected to show the results of the education which they have received.

The artisans' visit to Paris I will not do more than allude to. The able paper read by Mr. Hawes (my predecessor in office) last session, when I had the honour of presiding, was so exhaustive of the subject, that it would be impertinent on my part to attempt to add anything thereto, except to say that Mr. Coningsby, one of the reporters on the Paris Exhibition, has recently returned from a tour of inspection in the United States, where he was sent by the Society, and his report will shortly be published. I may also refer to the "Artisans' Reports on the Paris Exhibition," for the purpose of remarking that, while the various writers differed in many things, they all agreed as to the great disadvantage under which English workmen labour in the want of anything like technical education; and, also, as to the great advantage which French workmen possess in being able to walk about the streets of Paris, meeting at every turn objects of great beauty and elegance, and thus becoming insensibly educated in the principles of art, a result which certainly would never follow the most lengthened perambulation of the streets of London.

On the subject of Technical Education I feel that I must again appeal to your forbearance. I have read a good deal of what is to be said on this question, and have formed my own opinions, but doubtless I am speaking in the presence of many gentlemen so much more practically acquainted with these matters than I am, that, if politeness permitted, I fear they might get up

and tell me I was talking nonsense. However, gentlemen, this subject is of such importance, that it would be unbecoming in me not to give it some consideration. A most important and influential conference was held here in the course of last session, and the conclusions which were arrived at by the Committee then appointed, are, I think, beyond the region of controversy. At first they met with some difficulty, owing to the largeness of the subject, but it appears to me the great point they arrived at was this, that scientific principles should form the groundwork of all technical education; that is to say, as I understand it, that it is of no use to cram a child or young man hitherto uneducated with scientific facts, without teaching him the principles upon which those facts depend. This is what I take to be the meaning of the principle that science is to be the foundation of all education of this kind; and in this view I appear to be borne out by the remarks of Mr. Ayrton, on the occasion when the report of the sub-committee was presented. He says that, after deliberately examining the subject, he is strongly of opinion that the system of cramming, as at present practised in some of our seminaries of learning, is fatal to anything like success in the various occupations in life which those who are the subjects of it are afterwards called upon to engage in. The great mental defect of ordinary English workmen is, that for want of early training, they seem totally unable to apply the knowledge or skill which they possess to any new circumstances outside of the groove in which they have been accustomed to run. And this reflection leads me to remark, without wishing in the slightest degree to throw cold water on technical education, that we must not expect too much from it all at once, and must look for its first and chief results in a higher class of foremen and directors of industry, rather than in an immediate and general advance in the intelligence and capabilities of our mechanics themselves. We all know that the great and increasing tendency of the present day is towards a more and more minute subdivision of the processes of manufacture, which, though exercising an advantageous economical influence upon all parties concerned, the public, the employers, and the workmen themselves, cannot fail, in some degree, to have an injurious effect upon the last intellectually, as their employment is rendered thereby more and more mechanical. As this tendency is one which we must expect to continue, we must, as I have said, direct our efforts to enabling men of perseverance and ability to raise themselves to the position of foremen, and to providing the highest possible means of education for the latter class, amongst whom, indeed, there is at present the greatest necessity for higher scientific training. At the same time, it must not be forgotten that every mechanic will, from the nature of

things, perform his work better from knowing something of the principles upon which he is acting.

Mr. Whitworth's munificent gift for the foundation of thirty scholarships, to be held by those who are more or less intimately connected with mechanical pursuits, is an example which others interested in the spread of technical knowledge, and endowed with the same liberal spirit, will, it is to be hoped, sooner or later emulate. The benefit to our arts, manufactures, and commerce cannot fail to be great, when the sciences connected with their successful prosecution are unfolded to the workmen engaged in them. While the general spread of the knowledge of what I may call the trade-sciences is, from the above causes, in a fair way of being realised, there is another aspect of technical education of which there is, perhaps, some risk of losing sight under present circumstances, but which I hold to be of the last importance, and the bearing of which upon that department in which I am a subordinate officer (although, from various circumstances, I have been called upon to be its principal representative during the last two years in the House of Commons), I am desirous of illustrating. I refer to the necessity that exists for a few members of a profession being specially trained in the highest branches of the sciences connected with their occupation. As I have said, in most professions and trades the multitude of workmen will necessarily acquire but a limited knowledge of science, even under the most perfect and extended system of public instruction. A complete mastery of even a single science will be acquired by but few only. But that a few should become complete masters of their special branches of science is in the highest degree desirable. It would be easy to illustrate the necessity for this by reference to almost any trade; but my official association with naval affairs during the last few years, inclines me to draw my present example from naval architecture. The repeated establishment of Government schools of naval architecture, during the present century evinces the great importance which successive administrations have attached to the training of scientific shipbuilders, and the cordial assistance which this Society has, on various occasions, rendered to the Institution of Naval Architects, from which has sprung the Royal School of Naval Architecture and Marine Engineering, attests the estimation in which you yourselves hold that branch of science. The progress of that school up to the present time has, on the whole, given great satisfaction to the Admiralty; it is already sending out into the shipbuilding profession a valuable body of young, well-trained men; and it is a pleasure to me to be permitted, on this occasion, to tell you

how much the Admiralty appreciate the services thus rendered to naval architecture.

I now go on to say that this art of shipbuilding is one which well illustrates the great necessity that exists for imparting the highest scientific training to a few of the most promising youths engaged in it. It is true that even a limited mathematical training is valuable to the shipbuilder, and not only to the draughtsman of ships but to the working shipwright, for many of the rules and methods which both of them daily employ are immediate deductions from geometrical principles within the easy reach of all. I am assured by those who understand this subject most intimately—for, though during my connection with the Admiralty I have become pretty well acquainted with most of the processes of shipbuilding, I preferred going for such details to the best practical authority—that the laying-off and the trimming of the timbers of a wooden ship or the frames of an iron ship often bring into play very interesting examples of practical geometry, especially in building the ends of the ship; and that of two men equally skilled in the use of their tools, he who has made this science his study will certainly be the better workman. I am even assured that, up to a quite recent period, some of the minor operations of laying-off a ship upon the mould-loft floor were universally performed by an inexact method, where geometrical science, not at all of the highest order, would have pointed to an exact method which could have been performed more simply, so that, even in the minor branches of the shipbuilders' art, such scientific knowledge as may be generally diffused will find direct application and produce immediate advantage. But what I wish now to point out and to urge is, that naval architecture embraces problems which can only be discussed and solved by those who receive a degree of scientific training much higher than that which we can reasonably expect to be imparted in ordinary public schools where science is taught. The rolling of ships is one of those profound and difficult problems upon which I have more than once had to answer questions in the House of Commons. A glance into the "Transactions of the Institution of Naval Architects" will show that, in this very room, mathematicians of such eminence as Dr. Woolley, Canon Moseley, Mr. Froude, Professor Rankine, and others of like distinction, have brought their profoundest knowledge to bear upon this intricate subject; and great as has been the light which they have thrown upon it, it is not too much to say that it still awaits a final and perfect settlement. The dependence of the forms of ships upon the weight of the materials composing their hulls is another difficult question. It was opened up by the Chief Constructor of the Navy,

in a paper read at the Royal Society in March last, but still awaits further development. The protection of iron ships from fouling is another unsolved problem, requiring scientific knowledge of quite another, but not inferior, kind. All the resources of chemical science have hitherto failed to accomplish this important object, although I am happy to say that the experiments of Dr. Sim and of some other chemists have recently renewed our expectation of seeing it, ere long, achieved. Indeed, so favourably have these experiments been received, that the Admiralty have given, or are about to give, orders that one of the monster ships now being constructed at Chatham, the *Monarch*, a turret ship, shall be coated with this preparation of Dr. Sim's invention, which from all we learn seems more likely to succeed than anything which has yet been tried.

I have already alluded to Mr. Whitworth's munificent donation, but I must not leave this subject without expressing the gratitude of the Society for the confidence which that gentleman has shown in us, by placing at our disposal three exhibitions, intended to prepare the holders to compete for the scholarships in May next. These Exhibitions the Council have bestowed upon three artisans, who they trust will make the best possible use of the advantages thus given them. Their names are as follows:—Mr. Richd. J. Ellis, of the Devonport Mechanics' Institute, shipwright; Mr. Edmond F. Mondy, of Deptford, shipwright; and Mr. William Whitford, of the Belfast Academy Science School, flax dresser. I am sorry that Mr. Whitworth will not be here this evening to receive the Albert medal, although his absence relieves me of an onerous duty, for I feel that I should not have been able, in presenting that medal, to do full justice to the feelings of the Society.

You will not be surprised to learn from me that I am one of those who think that, in the education of our artisans, national museums play an important part, for it was on this subject that I raised my voice for almost the first time in the House of Commons. I hold that our national collections, which are of inestimable value, should be made as far as possible means of education, instruction, and amusement for the people. The principles upon which the South Kensington Museum was founded and is conducted render it eminently an educational institution, but I cannot say as much for the British Museum, and I never did say so, because it is not open at times when the mass of the people are able to visit it; and I do not think that anyone but a *savant*, who knows exactly where to look for what he wants, will ever be educated by the treasures which are there collected. Some time ago I was assailed with a good many hard words for venturing to suggest that the surplus art treasures of the country should be sent round and exhibited in

the many museums which are now established in the midst of several of our hives of industry. For example, I said that the great collection of Turner drawings, which up to this time are buried in the cellars under the National Gallery, would be better placed in the museums at Manchester, Birmingham, and other great centres of industry, and I was told that I was talking nonsense, and speaking of what I did not in the least understand. That may be so, but still I think that it was in the main very sound sense, and I hope yet that I may live to see the day when these collections may be utilised for the instruction and education of our population.

I must congratulate the Society upon the establishment of the East London Museum, towards which we gave a donation of £100, and upon the character of the provisions which will govern it. You are doubtless aware that this most valuable institution will almost owe its existence to one of my colleagues in the Council, Mr. Antonio Brady, whose exertions in the matter are so well known. I understand that it will be opened in the evenings, that classes will be established in connection with it, and that every effort will be made to render it a truly educational institution for the benefit of the teeming population amongst whom it will soon be erected.

While upon the subject of museums, I cannot forbear alluding to an extract which I saw yesterday from the early history of the Society. In the year 1759, before there was such a thing in existence as a public Gallery of Art, the Society of Arts, wishing to encourage the study of Art, offered premiums for the best drawings, but, unfortunately, in those days they had no specimens which the pupils could copy; they therefore applied to my ancestor, the third Duke of Richmond, who had formed a collection of statues, busts, models, and pictures, which he allowed to be copied by the pupils of the Society. When I read that extract it gave me more confidence in undertaking my duties this evening, as I thought perhaps you might credit the brother of the present Duke of Richmond with some of the interest shown in the Society by the third Duke in 1759.

The next point to which I have to allude in connection with the operations of the Society, is the Food Committee. The supply of food for the people is a subject of the greatest importance, and is one in which the Society has done great things in the past, and we hope will do not less in the future. More than a hundred years ago, by offering premiums to the amount of more than £2,000, the Society of Arts effected a great improvement and increase in the supply of fish to the London market, breaking up the monopoly which then existed; and the same subject—that of the fish

supply—has been, during the past session, under the consideration of the Committee. They have received valuable information on the subject from Mr. Buckland, Mr. Lloyd and other gentlemen, particularly with reference to oyster culture and the preservation of salmon, and they recommend the appointment of a Piscicultural Committee to specially watch this subject. Valuable suggestions have been made as to certain modifications in the law upon the subject of fisheries, and I may remark, in reference to allowing time for the salmon to ascend the rivers for the purpose of spawning, that, although greatly extended in the present day, the principle is as old as the thirteenth century, for, on referring to an old book in my brother's library, I find that in the time of Alexander III. of Scotland there was a distinct law, prescribing that, "na man shall tak a fisch after evensong on Saturday until after sunrise on Monday."

With regard to the supply of meat, which is perhaps of more importance, the result of the committee's investigations seems, speaking generally, to be this—that they have not yet met with any process for preserving meat for importation from abroad which they can thoroughly recommend for adoption, but that their inquiries seem to point to the use of ice as the most probable solution of the problem, how to bring meat from Australia in good condition for the London market. It would certainly be rather a curious coincidence if the same means by which we succeeded in transporting salmon and other fish *ova* alive to the antipodes should also be successful in replenishing our own markets with dead meat. It is not improbable that this will be the case, but what seems still more extraordinary is, that the supply of food for the people of London seems likely to depend in the future, not so much upon the excellence of our own farming and stock breeding, as upon the cheapness with which artificial ice may be made. I understand that a paper is shortly to be read here on this subject by Dr. B. H. Paul, which will no doubt be very interesting. The Food Committee have also considered the question of the supply of milk, and in accordance with their recommendations the Council now offer prizes for the best form of can for conveying milk by railway, and also for the best form of railway van for the transport of meat. The Committee also suggest, with regard to poultry shows, that which I wonder has not long ago recommended itself to the intelligence of those who manage such things, that prizes should be given not only for live poultry of choice breeds, but also for dead poultry, shown side by side with the former, plucked and ready for the table.

I have now, I think, run briefly over the operations of the Society for the past year, but, in turning to the future, the field of view over

which one is called to glance, as extended by the great improvements that are making in arts and sciences, is now so vast as to be absolutely bewildering. I suppose those present are aware that there are serious projects for bridging or tunneling the channel, and connecting England and France by a roadway either over the water or under it. In these days science is so omnipotent that it does not seem to matter which plan is determined upon, for if you must get across the water either way is open to you.

We all know that one of the greatest characteristics of the present state of knowledge is, that whatever was formerly considered refuse or waste, is now turned to good account; a striking instance of this is to be found in aniline dyes, made from coal-tar, which was formerly of little or no value. These dyes have, as I am informed, made a perfect revolution in the art of dyeing and calico-printing, and I am glad to hear that a course of Cantor Lectures upon them is about to be given by Mr. Perkin, to whom we owe this most valuable discovery. In the face of all these wonderful improvements which are daily being made, I do not even despair of seeing the streets of London improved, and our monuments and public buildings made decent. I do not see why those monuments should not be made instructive to our artisans, and to French artisans when they come over, as those beautiful monuments and buildings in Paris were to the artisans whom this Society sent over to the Exhibition. But before we indulge in too sanguine expectations on this head, it behoves us to look around and see what is our present position. Everything seems to have been left to chance, and chance seems to have been upon the worst possible terms with good taste. Wherever there is an imposing site it is disfigured by unsightly edifices, whilst nearly all our buildings, possessing any pretensions to architectural merit, are carefully hidden from public observation. First, let us look at Trafalgar-square, designated, and rightly so, by the late Sir Robert Peel as "the finest site in Europe." Landseer's lions are certainly perfection, but when you have said that, I think the less you say of Trafalgar-square the better. The north side is occupied by the National Gallery, the exterior of which happily is doomed, while the interior is to be remodelled, towards which desirable end I hope my humble efforts have in some degree contributed. But until this takes place, what must be the feelings of any French artisan, coming over here to improve his taste, as he places himself between those two puny fountains and looks at the façade of the National Gallery.

Probably you would not suspect the Secretary to the Admiralty of having anything to do with the decoration of the metropolis, but it

did so happen that when that great General, Sir Colin Campbell (Lord Clyde), died, universally lamented, a large sum was subscribed for a statue to his memory, which was executed by Baron Marochetti. The next thing, of course, was to select the most suitable spot for the statue, and they not only had selected the site, but had proceeded so far as to prepare the basement, when, by my exertions, I had the plan altered for the sake of the credit of the metropolis. They were about to place the statue of this great general against the corner of the Admiralty-wall, out of sight of the Horse Guards, in fact, on nearly as inappropriate a spot as could have been chosen. If you want further examples, I would ask you to look at Portland-place, which, being one of the finest thoroughfares in London, is adorned at one end with an extinguisher-like steeple, and at the other by a statue of the Duke of Kent, so diminutive that I doubt not many persons are unaware of its existence. If we go to Hyde-park Corner, we find a heavy archway, disfigured by an equestrian statue, never intended for such an elevation, and on the other side of the road, a statue of Achilles, upon which public opinion has long ago passed its judgment. Many other instances might be given, but I think they are needless, and it is pleasing to be able to pay a tribute of admiration to the new Belgravia being built by Lord Westminster, much of the beauty of which we owe to the admirable taste and artistic feeling of Lord Grosvenor.

In the Thames Embankment there is a fine opportunity for the architectural improvement of the metropolis if it be taken advantage of; but the result will depend entirely upon what buildings are erected in its vicinity, and how the ground is laid out. I speak with the greatest possible diffidence, not having had an opportunity of consulting my colleagues at the Council Board on the subject; but, nevertheless, I say deliberately that I think it would be very advisable if this Society could call into existence, before that site is occupied, a Committee of gentlemen of taste and practical knowledge, who should send in a report to the Board of Works, saying that a Committee connected with the Society of Arts, which has done so much in this and cognate subjects, recommends certain principles for adoption. The Board of Works could take no exception to such a committee. We should assume no authority; but we, as a Society, should leave on record our opinions as to what was the best manner of occupying that which will certainly be a most magnificent site.

There is one thing which has made a deep impression upon me in connection with many of the movements of the present day. It strikes me, and has done for some time, that a great change has come over us since what I may call the period of Great Exhibitions. There has

arisen, not only in London but all over the country, a spirit of rivalry among men who feel that they have something in them, and that they would like to have an opportunity of distinguishing themselves, and I will mention an instance which came under my own notice. In the rural county of Buckingham last year Sir Anthony Rothschild announced his intention to have an exhibition, which he intended to confine to his own and the neighbouring parish, but as soon as it was announced there were such a number of applications from persons who wished to send in their little contributions that he was obliged to extend the area, so as to embrace a circuit of twenty miles round. The result was that there were no less than 3,000 contributors, including even farm-servants amongst the number, and on the first day there were 5,000 visitors present. I believe that before the Great Exhibition of 1851, the creation of this Society, under the presidency of the late Prince Consort, such a thing would have been utterly impossible, and its great success says much for the progress of intelligence and healthy emulation amongst our industrial population.

The very title of our Society, the object of which is to advance Arts, Manufactures, and Commerce, suggests to the mind the causes which have operated to place England at the head of the civilised world. No one can dispute that she owes her eminent position to her commerce and manufactures, and, carrying on the idea one step further, it is indisputable that it is her machinery which has given her the command of the markets of the world. Other nations, however, within the last few years have made such rapid strides in the same direction as to have nearly overtaken us, and with the advantage, in many cases, of a cheaper labour market, are beginning to undersell us even at home, for it is a fact, known doubtless to many whom I am addressing, that a short time ago a contract for locomotive engines, advertised by an English railway company, was taken by a foreign house. When things are assuming such a serious aspect, it behoves us all, and especially the members of such a Society as I am addressing, to consider whether the same means which brought us so far may not be used to carry us still farther; in other words, whether further applications of mechanical, chemical, physical, and economic science to arts, manufactures, and commerce, will not again enable us to take and keep the lead we have so long been accustomed to. In electricity we have an agent whose powers have as yet been but sparingly applied, save in electro-metallurgy and the telegraph—two important fields, no doubt, but it may be questioned whether they exhaust its capabilities. A few years ago a very interesting paper on the application of electricity to the

Jacquard loom, by M. Bonelli, was read in this room by our esteemed secretary, Mr. Foster, but the idea does not seem to have been taken up by the manufacturing community. A more recent invention is the electric organ, which I am told is a great success, and I observe with satisfaction that a paper upon this subject will shortly be read here. These are remarkable instances of the application of science to industry, and many such we trust will, ere long, suggest themselves to scientific men; but the direction in which the greatest economical effects are to be looked for is probably that of replacing costly and tedious manual labour by means of machinery. The sewing-machine, printing machinery of all kinds, and steam hammers, planing machines, and self-acting engineering tools of all descriptions, are notable cases in point; and I believe that experiments are now in progress which lead to the hope that the puddling of iron by machinery is not so hopeless as it has long been deemed. There are still grave difficulties to be surmounted; but, as I have said before, in these days science is all but omnipotent, and a result which would effect a saving to this country of upwards of a million sterling per annum is certainly well worth striving after.

The water supply and lighting of towns, regulations for public conveyances, and the cheap postage of circulars—as to which a warfare has recently been going on with the post-office—are all matters to which I think the Society may profitably and properly devote its attention; but the point which I wished especially to remark upon was the greatly enlarged area over which our inquiries now extend. I hardly know whether the appliances of the Society are equal to all the calls which appear, day by day, to be pressing upon us in increasing numbers, but if they are not, I am sure more will be provided.

Whilst the range of the arts and sciences is continually increasing, I may also remark that the sphere for our commerce, and the facilities afforded to it, are no less swiftly extending. How rapidly is a network of railways being constructed over the whole of the civilised world. Indeed, whether as regards communication by water or land transit, the improvement in our means of progression is equally remarkable. The great chain of the Alps, which hitherto has been an insurmountable barrier to the interchange of commerce between France and Italy, is now, thanks to railways and tunnels, a barrier no longer. The obstacle which the Lake of Lucerne has always interposed to direct communication by rail is about to be removed, for, by means of steamers, the trains are to be transported bodily from shore to shore, and you know that the same principle of trains and steamers has been for a long time considered by some of our most eminent shipbuilders and

engineers to be applicable to join the shores of France and England. Meanwhile, the great barrier to our water communication with the East—the Isthmus of Suez—is rapidly disappearing. I do not know whether you are all aware that the Admiralty have already sent small vessels from Alexandria to Suez by the minor canal; but such is the fact; and a recent number of *Engineering* gives the following interesting figures as to the state in which the works of the great canal are at present:—"The total quantity of excavation removed and to be removed on the line of the Suez Canal is nearly one hundred million cubic yards, being 74,112,130 cubic metres, or 96,864,554 cubic yards. Of this vast quantity almost exactly two-thirds, or 64,447,545 cubic yards, had been removed on the 15th September last, and the work of removal was going on at the rate of more than two and a-half million yards a month." That is in one part of the world; and the same journal contains a statement that a plan has been set on foot in New York for constructing a ship canal across the Isthmus of Darien, that a company has been formed and the necessary funds guaranteed, and that the United States Government has sanctioned and adopted it. At the same time new railway extensions are continually going on all over the East. What facilities for commerce do all these changes foreshadow! I am a Conservative, and therefore may go slower than some people, but I confess that to my mind it does not seem improbable that even in our own lifetime we may hope to see, without being over sanguine, the time when we may circumnavigate the northern hemisphere in a ship, or travel from London to Peking in a railway carriage.

In concluding my inaugural address at the opening of the 115th session of your Society—and there is something very venerable in that phrase—I must again ask your kind consideration of the circumstances under which I have been called upon to address you, and assure you of my earnest desire by every means in my power to promote the objects which you as well as myself have so earnestly at heart.

The CHAIRMAN then presented the Society's gold medal, with a prize of fifty guineas, to Mr. W. A. Gibbs for his essay on "The Harvesting of Corn in Wet Weather."

Mr. GIBBS thanked the Society for the honour which had been conferred upon him.*

The Albert medal, awarded to Mr. JOSEPH WHITWORTH, was, in the absence of that gentleman, handed to the Secretary to be forwarded.

The Prince Consort's prize of twenty-five guineas was given to Mr. Robert Creaser Kingston, gardener, of the classes at the Royal Polytechnic Institute, who had obtained the greatest number of first-class certificates at the Society's examinations in the present and the three previous years.

* See p. 27.

Mr. BENJAMIN SHAW then proposed a vote of thanks to the chairman for his kindness in presiding and for the interesting address which he had delivered. In so doing he desired to pay a tribute to the zeal of the noble lord in keeping his engagement when suffering manifestly from physical infirmity, consequent upon the exciting and laborious contest through which he had just passed.

Mr. S. TEULON, in seconding the motion, said they were much indebted to Lord Henry Lennox for bringing before them various interesting facts which had come under his notice as Secretary to the Admiralty. It was quite certain that Technical Education was the great question of the day, and the information they had received upon that point was most interesting and valuable.

The motion was put by Mr. Shaw, and carried by acclamation.

SECOND ORDINARY MEETING.

Wednesday, November 25th, 1868; SEYMOUR TEULON, Esq., Member of the Council, in the Chair.

The following candidates were proposed for election as Members of the Society:—

Huggins, Henry, Gordon-house, Kentish-town, N.W.
Rönn, Hermann S. Von, 21, Kensington-park-grdns, W.
Sadgrove, Archer W., Ellerslie, Eltham-road, Kent.

The Paper read was—

A GLANCE AT THE PAST AND PRESENT OF THE SOCIETY OF ARTS, WITH SOME SUGGESTIONS AS TO THE FUTURE.

By S. T. DAVENPORT, Esq., Financial Officer of the Society.

INTRODUCTION.

GENTLEMEN,—I feel that it is due to you that I should state the reasons which have induced me to seek to occupy this place on the present occasion. Twenty-five Novembers have now passed since I first appeared in this room as an officer of the Society of Arts, and it may, therefore, seem not unnatural that one who has known the Society for a quarter of a century, and has spent the best, and possibly the brightest, years of his life in its service, should feel an earnest, and, perhaps he may say, an affectionate interest in its welfare, and should venture to come before you this evening, in order to pass in review some of its proceedings since he has been connected with it, and to compare its action during that time with the action taken by the founders of the Society one hundred and fifteen years ago. I propose, with your kind indulgence, to bring before you, in as few words as possible, a comparative view of the Society's work in early and in more recent years, and to compare the results of the action taken in each case; and, in conclusion, I shall venture to suggest what I consider might, with advantage, be the Society's course of action in future.

Before I do so, however, it will, perhaps, be convenient that I should endeavour to describe the position of the Society a little more than a quarter of a century since, and to that I will at once proceed.

On the 29th May, 1839, Mr. Arthur Aikin resigned the office of secretary, which office he had filled for twenty-two years; he was succeeded by Mr. W. A. Graham, on the 11th December, 1839; that gentleman continued in office till the 21st December, 1842, when he was succeeded by Mr. Francis Whishaw, who was elected secretary by the Society on the 19th April, 1843; that gentleman, in turn, resigned office in 1845, and was succeeded by Mr. John Scott Russell.

In 1840, the year following Mr. Aikin's resignation, an order of the Society was passed, by which certain offices were abolished, and it was determined that in case of a

vacancy occurring in the office of secretary, it was not to be filled up, without the expediency of so doing being first considered. At the annual election in 1842 it was allowed to remain unfilled.

On the 21st April, 1843, His Royal Highness the Duke of Sussex died; he had been president of the Society from 1817. On the 24th February, 1844, Miss Cockings, who then acted as housekeeper, and of whom it is recorded that she assisted her father for several years previous to 1802, died. Her father was registrar for thirty years. Thus, in the short space of five years all who had assisted in carrying on the work of the Society were removed. And in November, 1844, on the first occasion of my being present at a meeting of the Society, the only remaining stock in the Society's possession was ordered to be sold out to pay some of its debts; and with its sale the Society of the past may be said to have ceased to exist.

FIRST PERIOD.—BEFORE INCORPORATION.

I will now proceed to the consideration of the early history of the Society; and in order to a proper understanding of the importance of the object its founders had in view, the state of things in England at the time of its establishment should be kept in mind. The country had been for a long period consuming its forest trees in constructing its navy and mercantile marine. Coal was almost unknown as a fuel—agriculture was practised by rule of thumb, with but few mechanical appliances to aid it; the land was undrained, and vast tracts were covered with bog, or remained uncultivated swamps; the hills and mountains were unplanted;—the manufactures of the country were dependent for their supply of yarn upon the hand spinning of peasants and the poor of towns;—machinery had not been called in in aid of manual or brute force;—education was neglected;—art was discouraged;—and the poor, even in the city of London, were all—old and young, honest and dishonest—herded together, where they were received into workhouses at all. Food also was scarce;—bread dear and bad;—the fish supply a monopoly;—and many of the staple manufactures—which were then declining—dependent upon foreign countries for their supply of raw material.

Internal communication between one place and another was carried on partly by circuitous coasting voyages, partly by rivers, obstructed by shoals during the summer season, and swelled into formidable torrents by the winter rains, and partly by roads, so ill-constructed and in such a state of neglect that the cheapest and most expeditious way of transporting commodities along them was on the back of packhorses.

When the civil commotions and foreign wars, which for sixty years had agitated the whole British nation, were finally settled by the results of the insurrection of 1745, and the present Royal family, after an arduous struggle, was at length firmly established on the throne, the minds of men naturally began to turn themselves to those arts of peace which the uncertainty of public affairs, and the more exciting interest of political party, had consigned to a long neglect.

The attention of the country with respect to the Arts, the Manufactures, and all those things in which the public wealth of the community consists, was at that time considerably inferior to that of Holland, the Netherlands, France, and some of the Italian states. A large proportion of our manufactures were literally so, being made by hand; the prime movers of the common machinery which we possessed were the elements of water and wind, and the living strength of men and animals, except in a few places, where the steam-engine of Savery and Newcombe, a machine of rude and imperfect construction, and of little power, was employed in raising water. The smelting and conversion of ores of iron and of other metals were performed almost wholly by means of charcoal, by which not only was their cost enhanced, but the quantity produced was very limited, in consequence of the diminished extent and impoverish-

ment of our woods and forests. No manufactories of pottery but of the very coarsest kind existed. Vessels of wood, of pewter, and even of leather, formed the principal part of the household and table utensils of genteel and opulent families; our porcelain was imported from China and Japan, from Dresden and Paris, and was an article rather of luxury than of convenience. The principal part of our linen was from the looms of Germany and Holland, and of our silks from those of Italy and France. A few of the coarser articles of cotton, such as fustians, had begun to be manufactured in the neighbourhood of Manchester; but chintz, muslins, and all the other articles of finer fabric were brought hither from India. It is unnecessary to particularise objects of inferior importance, as the same general observations hold good with regard to them.

From a desire to alter this state of things our Society owes its foundation; and to William Shipley, a landscape painter, "who from a well-grounded persuasion of the extensive utility of the art of drawing, to this nation, erected the Academy in the Strand, opposite Exeter Change," is due the credit of having proposed it.

In 1753 William Shipley proposed, and in 1754 a meeting was held to consider the propriety of establishing the Society for the Encouragement of Arts, Manufactures, and Commerce. At that meeting, which took place at Rawthmell's coffee-house, William Shipley acting as secretary, it was the opinion of those present that drawing is absolutely necessary in many employments, trades, and manufactures, and that the encouragement thereof may prove of great utility to the public. It was resolved to bestow premiums on a certain number of boys and girls; and on the 29th of March, 1754, an advertisement was ordered to be issued. The first prizes were awarded in 1755, five gentlemen being named as a committee to judge the works sent in in competition. Of this committee, Mr. Henry Cheer, to whom I shall have to allude hereafter, was a member. Other premiums were advertised at the same time for the discovery of cobalt in England, the growth of madder, and the manufacture of buff leather. Among those who received prizes for drawings by boys and girls on the occasion of the first awards, was Richard Cosway, who afterwards became a Royal Academician and portrait painter of repute. The Society possesses an example of his work in the portrait of Dr. Templeman, who was secretary of the Society from 1760 to 1769.

On the 6th of February, 1755, William Shipley, as the proposer of the Society, was elected a perpetual member, and Mr. Baker was similarly elected, for the pains he had taken in drawing up the plan and promoting the welfare of the Society.

The Encouragement of Art was the first object sought by the Society; its proposer, William Shipley, sought encouragement for his pupils, and four or five of those candidates who first took prizes had been under his instruction, and were rewarded for drawings from his collection of prints, pictures, drawings, models, &c.

The premiums offered under the head of Polite Arts appear to have been ultimately grouped into 196 classes, and it was soon found necessary to refer to examples in the offer of premiums. This was difficult, owing to the fact that the nation did not possess any public museum, nor did the National Gallery then exist. The Society, therefore, under the circumstances, sought the support and assistance of the Duke of Richmond, who, between 1750 and 1756, had formed a gallery of statues, busts, and models, the examples in which were selected by John Wilton, sculptor to the King. In 1759, prizes were awarded to candidates under 21 years of age for drawings from the Duke of Richmond's collection. In March, 1759, premiums were also awarded to candidates under 20 years of age for drawings at the Academy in St. Martin's-lane. Thus we see private individuals and patrons of Art co-operating with the Society prior to the existence of the British Museum. It has appeared to me not improbable that the Society and those about

it may have had some weight with the government in inducing it to purchase that collection for the nation. It is evident that from the foundation of the Society those in power were joined with the Society and the patrons of Art; for on the day on which the Duke of Richmond consented to allow his collection to be used by the Society, the Duke of Newcastle, the Right Hon. William Pitt, the Right Hon. Henry Bilson Legg, Lord George Sackville, the Earl of Thomond, and Viscount Fitzwilliam were elected members.

"Sir Hans Sloane, Bart. (who died in 1753), may not improperly be called the founder of the British Museum; for its being established by Parliament was only in consequence of his leaving by will his noble collection of natural history, his large library, and his numerous curiosities (which, it is said, cost him £50,000) to the use of the public, on condition that Parliament would pay £20,000 to his executors. Accordingly, Montague-house was purchased, with an extensive garden of nearly eight acres, by the British Parliament, for £10,500, as were also Sir Hans Sloane's curiosities, for £20,000, in the year 1753, and the money was raised by a guinea lottery the same year. And in 1756 the valuable legacy of Egyptian antiquities of the late Colonel Letheullier, and the antiquities of his nephew were joined to it; and in the year 1771, Sir William Hamilton's antiquities were purchased, with certain other additions, for £9,000. To this collection were added the Cottonian Library, the Harleian Manuscripts, collected by the Oxford family, and purchased by Parliament for £10,000. There was also a collection of books given, and £7,000 in cash left, by the late Major Edwardes; and as an addition to the Cottonian Library, Mrs. Maddox, relict of the late Mr. Maddox, Historiographer Royal, left by her will her husband's large and valuable collection of manuscripts, which had engaged his attention for many years, affording materials for a complete history of tenures, which is much wanted. His late Majesty, George II., in the year 1757, in consideration of its great utility, was graciously pleased to add thereto the royal libraries of books, about ten thousand, and manuscripts, to about eighteen hundred, all collected by the different kings of England." *

The British Museum was first opened to the public in 1759. It is certain that there were those about the Society who were connected with its progress and management, for on the 6th April, 1757, Mr. Nicholas Crisp presented the Society with a copy of the seal of the British Museum. The objects of the Museum, and the attention of those connected with its management, were also in accord with the objects of the Society, for in 1764 (at which date the Society was doing much to improve agriculture) I find that Dr. Watson, of the British Museum, sent a letter to the Society, which letter he had received from Mr. W. Brownrigg, in which the following paragraph occurs:—

"Whitehaven, February 4th, 1764.

"In my hurry in London I had not an opportunity of searching for some of the *spelt* which I brought from Germany, and which you were pleased to say you would sow in the garden of the British Museum among the many curious plants you cultivate there. I herewith send some of the grain."

When the collection was purchased and opened to the public it was arranged in 38 rooms, 14 of which were filled with objects of art of various kinds. I mention these facts to show that soon after the Society was instituted the nation acquired a gallery of art, in which students of art sought to pursue their studies. But, while the nation was acquiring its museum, the Society was occupied in considering a plan for establishing an academy of art. I have long felt that William Shipley, when he proposed the establishment of a society for the encouragement of Arts, Manufactures, and Commerce, meant thereby a society mainly for the encouragement of

* See "Museum Britannicum," by John and Andrew Van Rymdyk, 1778.

Art; and this opinion appears to be borne out by the fact that on the 19th February, 1755, Mr. Henry Cheer, one of the adjudicators at the first art competition, delivered to the Society a communication, entitled "A Plan for an Academy of Sculpture and Painting," which was read over and a copy presented to the Society. This communication was accompanied with a draught copy of a proposed charter of incorporation, and on the 26th November, 1757, Dr. Madden, when writing to the secretary, says:—"Pray let me know when the charter is in any way of forwardness, for without that (as I formerly ventured to tell you) your Society is but a rope of sand."

Mr. Cheer's plan appears to have been finally disposed of in 1758, and one month afterwards the rules of the Society were published, at which time Mr. Box was acting as secretary at the Society's offices, opposite the Exchange-buildings, in the Strand; and in March, 1760, Dr. Templeman was elected to the office of principal secretary. The artists of London having applied, in February of the same year, for permission to hold an exhibition in the Society's rooms, the permission sought was granted, and exhibitions continued to be held there for several years. The origin of these exhibitions and their results are thus referred to in the first volume of the Society's Transactions.

"The reputation acquired by candidates in consequence of their performances remaining for some time under the inspection of the Society, before and after adjudication, occasioned the artists in general to apply for an exhibition of their works in the Society's great room, which request was accordingly complied with and repeated for several years. Hence arose the annual exhibition of the rival artists, who formed themselves into separate bodies. The emulation by which each body was excited helped greatly to promote the rapid improvement of the arts, and to attract the general attention of the public towards their performances, and hence the royal patronage and protection they have since had the honour of obtaining, and under which they so eminently and deservedly flourished, may in some measure be derived. The Society having been thus far fortunately successful in rearing the infant arts in this kingdom, to such maturity as qualified them for royal favour, next confined the award of their premiums to those who may intend to be professors of the arts, or such young persons of rank and eminence, who may probably become hereafter the patrons and patronesses of the fine arts. Encouragement has also been given to those branches of the polite arts which will more immediately tend to improve the manufactures and consequently promote the commerce of the country."

The Society took possession of the building it now occupies in 1774. Its site was proposed by Mr. C. W. Pinchback in 1759, and in 1777 Mr. James Barry, at that time a member of the Royal Academy, proposed to decorate the Society's great room with paintings "analogous to the views of the institution."

It is not my intention on this occasion to relate the history of Barry's pictures which surround this room, but as the Society, in 1864, added two pictures to the series, viz., that of Her Majesty the Queen and His Royal Highness the Prince Consort, I have thought it might be interesting to point out how entirely its act has been in accord with Barry's views.

I may state that Barry's pictures, as they now appear, are not in all respects as he originally painted them. Many additions were subsequently made by him. He added the naval pillar in the picture of Father Thames, and in that of the Society he placed on record his views as to what the method of arrangement should be in the construction of medals and coins; and by placing an urn in the opposite corner of the same picture, he endeavoured to point attention to some of the faults and want of taste which surrounded almost every manufactured article of utility.

The portrait of Barry himself, in the large picture, represents him in the character of Timanthes (an excel-

lent painter, recorded by Pliny), sitting on the base of the statue of Hercules, holding in his hand the famous picture of the Cyclops and Satyrs. This portrait was intended by the artist as a record of his age, and to express his character and energy as an artist at the time the pictures were undertaken.

On October 1st, 1798, Barry, when writing to the Society, from 36, Castle-street, Oxford-market, upon some other matters, takes occasion to make the following remark, in reference to the pictures in the great room:—

"But not to wander from ye concerns of your great room, or rather (as your views extend to everything of high publick concern) not to wander from my work in your great room, I shall close this letter by observing that perhaps those pictures in your room may in some few places seem to want a varnish to unite and bring together ye parts more out; but on second thoughts, it may perhaps appear otherwise; it may be that ye publick eye is a good deal corrupted by ye glitter of coach pannels and Birmingham tea boards. This glitter would be horridly meretricious and out of its place in large works of a serious and generally unostentatious nature; and besides, ye pictures are yet fresh, and if any little matter of varnishing may be thought of use in certain parts, it will be better some time hence."

In a second letter to the Society, dated 31st March, 1801, I find the following paragraph:—

"With the publick reputation of these pictures I have every reason to be gratified and flattered, and there remains nothing further for me to wish than that the Society would have the goodness to favour their work on the cultivation of the human faculties, and me, with their protection and countenance in the circulation (when occasion offers) of those large and small prints, upon which so much labour and time have been expended, more especially as this protection and countenance of the Society might now help to support me under the heavy oppressions of the malignity and envy which have followed the reputation of that undertaking, beginning with the second week of the exhibition of the pictures, and going on, in one shape or other, with a steady continuance ever since. However, as this has been so notoriously apparent, I shall take no further notice of it, but proceed to an observation which is, I think, worthy to employ the attention and consideration of the Society, viz., that although individuals are short-lived and transitory, yet societies may be eternal, or at least of long duration. This being the case, it still remains to be considered by the Society that some arrangement ought necessarily to take place with respect to the pictures of the presidents, as the example already set in the two noble personages whose pictures are placed over the two chimneys of the great room (which cannot be followed any further), makes some other arrangement absolutely necessary. There being no other situations in that room, these two portraits, unconnected with everything else, stand like ominous obstructions to the further progression of the Society, besides being an unlooky (*sic*) interruption and breach of the continuity of the work round the room. By the removal of these two portraits to the committee, or to some other room, where the example can be followed by similar portraits of the most noble or other great personages who shall succeed each other in the presidency, that matter would be promptly disposed of. When the Society, many years since, placed these two portraits over the chimneys in their great room, no idea was then entertained of anything further than continuing the same arrangement, by placing portraits of their presidents near each other, on the same wall, according to their succession, in conformity with the general usage, as is seen in town halls and other places of general resort. But since that time, having (if I may use the expression) consecrated these walls of their great room to a more intellectual destination, and of a much more extensive publicity, which might comprehend whatever should have a tendency to the improvement of useful arts, and the consequent melioration of society,

and might at the same time serve as a mausoleum of those benefactors of mankind who have been the true ornaments of their several ages and countries, and whose exemplary memorial it is so much our interest to preserve. All these reasons taken together will surely induce the Society to adopt another arrangement by which these two portraits over the chimneys may be removed to some other place. The two noblemen whom they represent would be the first to advise it, could they be consulted on the occasion. One of these noblemen I had the honour of knowing sufficiently to affirm that his delicate sense of propriety, and his zeal for the Society, would exclude all doubt on this occasion, or otherwise my sincere veneration for his amiable memory would never suffer me to propose it; and, by all accounts, Lord Folkstone (whom I did not know) was a man of similar character to his relation, the late Lord Romney. Under the idea, then, that these two portraits will be removed, and as it is, of all things, my earnest wish to leave that work in the great room, in the most perfect state to which my abilities can attain, I am (if it should meet the wishes of the Society) ready to execute such designs for those spaces over the chimneys as may not only correspond with the ethical and patriotic views of the rest of the work that goes round the room, but which, from their important central situations, may become very principal, and, as it were, sources of vitality to the other parts. The space over that chimney between the two national subjects of the Thames and the Society may be filled up with matter the most pertinent, patriotic, and moral, which could not fail of being exceedingly popular, as it is, in a great measure, called for by the circumstances of the time, and most perfectly congenial with the views of the Society; and for the other space between the Orpheus and the Harvest Home, I have made a design, than which nothing can be more apposite and illustrative of one of the most classical and important matters respecting the manufactures of the ancient world, and which is, indeed, wanting in that place. These two pictures, in those central and important situations, would crown the work with all necessary propriety and interest, and would cost but little, as, I believe, the materials, canvass and all, would not exceed £10, and the meetings of the Society need not be interrupted.

"But, whether or not, the Society may choose to accede to this proposal of substituting these two co-operating designs in lieu of the two portraits over the chimnies of their great room; yet I must request leave to mention to them that as certain parts of the Olympian victor, the Elysium, and the other pictures which had been re-touched when I was last at work in the room could not then with prudence be varnished, and now stand much in need of it, it would oblige me very much to have permission for doing this justice to those parts during the summer recess of the Society, if Almighty God, my good and indulgent Patron, shall afford me health for it; if not, I request, and most earnestly entreat the Society that they will have the goodness never to permit anyone else to touch those pictures under the pretext of varnishing, or under whatever pretext whatever. In the midst of so much mistaken pursuit of art, either so slow and inconsequential, or so alien and uninteresting to the national reputation, and so utterly inadequate to its true dignity, and to what ought to have been expected; in such times it will be well to have at least the discretion of preserving unsullied for posterity whatever we may have of a contrary character."

Permission was at once given to Barry to carry out the plan proposed, but as the removal of the portraits of Lords Romney and Folkstone appears to have been subsequently opposed, another letter was written by Mr. Barry, under date 6th May, 1801, as follows:—

"It gave me great satisfaction on last Wednesday to find, by the almost unanimous vote of the Society for the removal of the two portraits from the spaces over the chimnies, that I was not mistaken in the high opinion

I had conceived of their rectitude, good sense, and patriotism, which could so well distinguish between appearances and realities, between the arguments of mere barren, fruitless appearance of respect and veneration which were offered for continuing those portraits in their present situation; and those arguments of contrary character which, grounded upon utility and realities, were adduced for the prudent removal of those portraits to some other situation more consistent with the idea of the progression and continuance of the Society; they would be no longer individual and insulated, but, on the contrary, where the virtuous and amiable example of the personages represented in those portraits would stimulate and fructify, standing, as they would then do, at the head of a long list of those illustrious personages, their successors who were to follow them in their office and in their worthy example.

"But as this matter has been opposed at its outset by the president, his Grace the Duke of Norfolk, and at its termination by two of the vice-presidents, although this opposition seemed to have made no impression on the Society, and had no other effect at either time than the concern of differing in opinion with those worthy personages whom the Society esteemed so much; and as I have since been informed that several of the nobility are also disinclined to the removal of those portraits, and that by some strange fatality or mysterious procedure (for which 'tis difficult to account) that this matter is (however absurdly) yet likely to be considered out of the Society as one of those pestilential political contests between different orders or ranks of the community, into which everything (for some time past) has been shamefully and diabolically converted; and as I have no wish to offend anybody, and should be, indeed, exceedingly sorry to be concerned in anything which could be in the least disagreeable to my Lords Romney and Radnor, for whom I have the most sincere respect and esteem; and as there is now hanging up in the Society's rooms a letter from his Grace the Duke of Norfolk, our worthy president, notifying his intention of moving for rescinding the resolution of the Society respecting the removal of those portraits, the public and the Society will, I hope, excuse me if I should withdraw my intention of supplying anything for those spaces over the chimnies. To say the truth, I feel a little hurt, and cannot see the reasons or motives which might induce those or any other noblemen to offer any opposition to what I had proposed, and to what the Society had almost so unanimously adopted; and as I have no respect for insolvable mysteries when they are out of place, and employed in any other concerns than those of religion, this opposition is not edifying, tho' it be astonishing. Had the portraits been immovable, been painted on the wall, the place might then be well considered sacred, and I should hear with horror any proposal for blotting, for putting them out of existence, to make room for any performance, tho' painted by Apelles himself, particularly that of my good Lord Romney, for whom I feel a reverence and an affection almost filial, there is nothing of picture that could be brought into existence that could console me for the effacing any memorial of him, but the case was quite other ways; there was no necessity for putting anything out of existence by embracing the opportunity that happily offered of creating something new."

Thus the plan proposed by Barry was withdrawn, and it was left for the members of the Society, at a later date, to adopt the plan then suggested by him.

Barry died on the 26th February, 1805, in the 65th year of his age. His corpse was placed in the Society's great room, on the 7th March, with appropriate solemnity, and the following morning was conveyed to St. Paul's Cathedral, attended by several vice-presidents and many members, and deposited between the remains of Sir Christopher Wren and Sir Joshua Reynolds.

While speaking of James Barry and his works, I cannot resist a wish to mention that about the year

1820—just one year after the Society had rewarded Alois Senefelder for the invention and introduction of lithography—a lithographic circular, with a portrait of Redmond Barry, brother of the late James Barry, at its head, was issued by the Society, asking for subscriptions for the relief of the brother of the late James Barry, historical painter, and formerly Professor of Painting at the Royal Academy.

Thus the Society continued its grateful memory of Barry and his great works, and aided his brother in the hour of his distress and severe affliction.

The polite arts were also largely promoted by endeavours on the part of the Society to improve the materials employed by artists, by investigating processes lost or used in foreign countries, or such as aimed at the production of commercial art products by new or improved processes. Thus aquatint, mezzotint, wood and other engraving processes were sought to be improved; while the pigments—oils and varnishes used by the painter—were modified, or new agents introduced.

The arts of bronze casting and chasing, iron casting, artistic metal and other works, were also encouraged.

Taking casts or impressions of intaglios or cameos in paste or glass of various colours in imitation of the originals was carried to a high degree of perfection, and was looked upon as a means of preventing many of those monuments of the antique taste from being lost to the modern world. Of the production by one artist it is said:—"He has attained also to the art of using an opaque dark glass for the ground and a white one for the relief, by which they are made to imitate very closely the antique cameos cut on laminated onyxes."

New arts were encouraged, as in the case of lithography. In 1795 Alois Senefelder, an actor of Munich, having discovered the art of lithography, first attempted to apply it to print music, but it was not till some years later, and after many failures with his printing presses, that he succeeded in working the process to his satisfaction. The works of Senefelder at length became known in this country through Mr. Rudolph Ackerman, who brought the discovery before the Society, and about the same period Mr. C. Hulmandel began working the process, and greatly improved the practical part of the art. The Society, in 1819, awarded its gold medal to Senefelder as the inventor of the process, and in acknowledgment of its receipt, Senefelder sent to the Society, through Mr. Ackerman, one of his lithographic presses. The Society, in the year 1819, also awarded its silver medal to Mr. Hulmandel, and published an account of his improved processes of lithography in its Transactions.

Another art, and one which gave a fashion to the public taste for many years, was also due to the Society. I refer to engraving on steel. It is said that Albert Durer etched on steel, and that there are four plates etched by this artist, impressions of which exist in the British Museum, which, in all books of art are recorded as having been executed in steel. Of these one has the date 1510 inscribed on it. Pieces of saw blades were the material upon which nearly all the first attempts to revive this art were made, but with little success. Mr. Raimbach attempted to introduce the practice of engraving on blocks of steel, but without any material success; and it was not till the Chairman of the Committee of Fine Arts of this Society, Mr. Charles Warren, who, in his youth, was much employed in engraving on metals for the use of calico printers and gunsmiths, turned his attention, at the suggestion of Mr. Gill, one of the Chairmen of the Committee of Mechanics of this Society, to the method employed by the artists of Birmingham in the manufacture of ornamental snuffers and other articles of cast steel, that the art was brought to perfection. The process employed at Birmingham was "to subject the steel, after having been rolled into sheets, to the process of decarbonisation, by means of which it is converted to a very pure, soft iron, being then made into the required instrument or other

article. The ornamental work is engraved or impressed on the soft metallic surface, after which, by cementation with proper materials, it is again converted superficially into steel. Mr. Warren modified this process, and obtained thin plates of steel capable of being acted upon with acids, and cut with the graver without destroying the cutting edge of the tool, as was the case with the saw blades, the resulting plate yielding a greatly increased number of impressions." Here we see the practice of a comparatively unimportant art and trade brought to bear upon an art industry of a much higher order, and ultimately leading to the production of one of the largest and most successful fashions of the times—an art process, which by yielding ten or twelve times the number of impressions yielded by copper plates, enabled capital to be invested in the production of works of a high class, and gave rise to the publication of the "Annals," by Ackerman and others, and the works of Heath, Finden, Lekeux, and their fellows.

This process of conversion and re-conversion was soon afterwards applied by Perkins in the production of steel rollers, by pressing the faces of soft steel rollers into the engraved surface of a hardened, engraved block, such rollers so obtained being in their turn hardened and employed in multiplying the original engraving for commercial purposes, as in the case of postage, receipt, and other stamps at the present day.

I must not, however, linger upon this branch of my subject, but proceed at once to another field of the Society's operations.

AGRICULTURE.

The subject next in importance to art was agriculture. The promotion of agriculture was not embraced in the plan proposed by the founders of the Society. One of the first letters written by William Shipley, and dated 11th April, 1754, was in reply to a communication received from Mr. Charles Powell, in which he had suggested that agriculture is a proper article to be added to the Society's premiums; and Mr. Shipley says, in reply, "They think it a proper article, but it will require caution, otherwise those parts of the kingdom which have already made great improvements will obtain all the premiums."

The introduction to the first book of rules and orders, however, shows that it was at once included in the Society's system of action, for it is there stated, "When every country in Europe is attempting manufactures, and striving to gain a superiority in commerce, it must be the desire of every well-wisher of his country to excite a spirit of emulation, and encourage and reward ingenuity and industry. The readiest way perhaps of reforming habits of vice is to remove those of idleness—itsself the greatest political vice.

"The profits due to invention and labour are sometimes remote, often uncertain, and, consequently, to the multitude insufficient.

"Therefore, to add a spur to industry, to promote agriculture, increase and improve manufactures, and extend trade, no method seems so well adapted as that of bestowing premiums or rewards which may excite men to undertake and accomplish useful designs. Rewards, skilfully appointed and impartially distributed, have at all times been thought to operate powerfully on the minds of men. The difficulty has rather consisted in the application than in the effect—rather in selecting the proper subjects of rewards than in finding persons who would endeavour to merit them.

"It is not sufficient merely to fix upon proper subjects; for unless labour be assisted by art—unless the knowledge of the learned be communicated to direct the hand of the industrious, the labourer may waste his time and strength in vain, and study degenerate into amusement."

It is impossible on this occasion to trace, step by step, the course pursued by the Society. I must, therefore, confine my statement to a few facts indicative of the importance of the Society's action in this field of opera-

tion. It at once set about attaining the following objects:—The reclamation of waste land, the planting of timber, the improvement of agricultural produce; and Robert Dossie, a member of the Society, in commenting upon this branch of the Society's work, says in 1768:—"The improvement of agriculture is ever a matter of consequence, as well to each particular country as to mankind in general. It is particularly important to a commercial nation—the support of trade depending on manufactures, manufactures on the rate of labour and wages, and labour and wages in a great degree on the price of the necessities of life."

The introduction of grasses, herbs, and roots as food for cattle occupied much of the Society's attention. Mr. Peter Wyche, writing to the Society in reference to grasses, says:—"We have found the means of supporting our cattle for two-thirds of the year by a perennial fresh vegetating pabulum. . . . Can it be imagined that such vast tracts of land as North Russia, Lapland, and all the countries north of Canada, Chinese Tartary, and all populous countries, have not some seeds, some grasses among them quite different from those of ours, and which, if transplanted here, in a less rigid and severe climate, might possibly answer. It ought to be the policy of all nations in the world to encourage the improvement of their lands to the highest degree they can."

"It is from the sanfoin, clover, lucern, and the turnip, natives of the southern countries, that Great Britain has been so greatly improved; and, if so, why may it not receive further improvement by the admission of the northern class, for such there must be. . . . The pleasure that arises in the naturalist's mind must be from the speculations he makes on what he investigates, and the greatest reward he can possibly propose to himself is to communicate his knowledge for the good of mankind; to conceal it is possessing a monopoly of the worst kind."

It may fairly be said that the pastures and root crops, as they at present exist in this country, resulted in a great degree from the Society's investigations. Turnips, carrots, and other root crops, as food for cattle, occupied much attention; and communications were carried on with many societies throughout Europe, with foreign countries, and America, with a view of finding substitutes for hay, and which would either resist more thoroughly the frosts and wet of our climate, or afford more abundant crops capable of being stored for winter consumption. Grass seeds were collected from all parts, and premiums were offered for the careful collection by hand of such as were known to grow freely in this country.

At the time of the offer of these prizes, grasses were sown indiscriminately—no care being taken to separate one sort from another, the sweepings of the hay loft were used as seed on the newly-sown meadow land, and the resulting crop was most unsatisfactory, but this state of things was soon altered to the great advantage of the grazier, farmer, and others requiring fodder for their cattle.

As a root-crop, the potato was an especial object of the Society's attention, notwithstanding the fact that the Royal Society had in 1662-3 appointed a committee to urge upon the fellows of that Society who possessed land to plant potatoes, and to persuade their friends to do the same, in order to alleviate the distress that would accompany a scarcity of food. To talk in the present day of the cultivation of the potato as an object deserving of the Society's attention and encouragement seems futile. We are too apt to consider that what we possess and obtain so readily our fathers and grandfathers necessarily obtained with equal facility, but such was undoubtedly not the case with many of the articles now in common use as food. A century ago, carrots, turnips, potatoes, rhubarb, and similar roots, were either unknown or uncultivated, and it is owing to the Society of Arts that we now possess many of them. The

potato and the true rhubarb were both objects of its attention as root crops, one as food the other as medicine, and though but small quantities of the last mentioned are now produced in this country for the latter use, still all know how large an article of consumption that plant forms throughout the country in early spring. The Society's Gold Medal was especially given to Mr. W. Greenhill, in 1784, for his cultivation of 84 acres of potatoes for the table. The potato was however looked upon by the Society as likely to be a staple article of food for cattle, as one acre of land produced only 260 stone of hay, while of potatoes 1,400 stone could be obtained from the same area. It is not at all times easy to trace the origin of machines in common use, but while speaking of the potato I may remark that in order to their being used as food for cattle, it was necessary to wash off the earth from their surface; and in Vol. XXII. of the Society's Transactions it is recorded that Mr. J. C. Curwen received the thanks of the Society for a model of a machine for cleaning potatoes, which is also applicable for washing linen. I do not put this forward as the origin of our domestic washing machines, but merely say that the necessity for washing potatoes was possibly one of the steps which led to the production of those appliances which are now so extensively used, both in connection with our manufactories and in private families.

It is, moreover, recorded in Vol. IV. of the Transactions, that the poor of Suffolk, in 1780, at which date potatoes were sold at 9d. per bushel, generally rejected the use of them, and it is not because in this country we now know how to cultivate and use them, that we are at once to conclude that all Europe is in the same position. Such is not the case. I may here relate what occurred so recently as 1855, within the Society of Arts. During the Crimean war a gentleman, a Prussian, called and asked to see the secretary. He stated that he had come to this country to endeavour to get into communication with the government, for he had made a discovery which he wished to dispose of, and which if employed in connection with the feeding of the army would save the country many thousand pounds yearly. Upon inquiry as to the nature of the discovery, he informed Mr. Foster that he had found that potatoes when baked were an exceedingly wholesome and savoury food, and that it was a much less wasteful way of cooking them. I need not add that Mr. Foster did not send him to the government, but I may say that he had great difficulty in making him believe that baked potatoes were to be had at all the street corners in the metropolis.

Drill ploughs, drain ploughs, the drainage of land, root-slicers, chaff-cutters, scarifiers, reaping machines, threshing machines, and means of harvesting hay and corn in wet seasons, were all subjects of premiums; and in all these cases it may be said the premiums offered were awarded, and, to a great extent, effected the object the Society had in view in offering them. But it was not sufficient that the product sought should be obtained; it was necessary to preserve it from injury, due either to the ignorance of the farmer or grazier, or to the ravages of the vermin, which then overran the country; thus it was estimated, that of the whole of the wool produced by the sheep of the country at that time, at least one-eighth part was spoilt by the practice of marking the sheep with tar, a substance which not only injured the wool upon which it was used, but also all that came in contact with it, as it was found impossible to remove the tar marks from the wool by any amount of washing; thus a loss was inflicted upon the country in that article alone amounting to a sum that has been variously estimated at from £40,000 to £200,000 per annum. The Society therefore sought to modify and improve the method of marking sheep.

Another serious loss to the farmer resulted from the destruction of grain, either consumed or spoilt by rats. The Norway rat, described as larger in size than the ordinary rat, more voracious, and more difficult to be

destroyed, had recently got into and overrun the country. The damage which the public sustained by the loss of corn from rats only was computed at some hundred thousand pounds a-year. But this was not merely an agricultural question, for Viscount Folkestone, who had been trying some experiments with a view to the destruction of Norway rats, when writing from Longford on the 30th August, 1755, says:—"I assure you we have the true sort, of the colour of wild rabbits, with several red hairs on their backs, and white upon their bellies. As to quantity, we have in two months destroyed an hundred and twelve in steel spring traps baited with raw meat, and we can learn of no other method to destroy them without shooting them, which we do sometimes. Though we have killed so many, the number that remains must be very large, as we continually hear them behind the wainscoat, and over our heads at top of the house. The cats kill a few of the rats, but they are rather afraid of the old ones."

TIMBER.

It is almost impossible for us, who live in an age of coal, iron, and petroleum, to realise the anxiety and necessity which formerly existed for preserving and cultivating timber. In order to do so, we must bear in mind how intimately it entered into every requirement of life.

A correspondent, signing himself "Pro Patria," under date May, 1760, says:—"The opinion of the ancients in regard to the importance of timber, was, that it ought to be one of the first objects of the attention of all Governments. To a commercial nation it is especially important in arts, manufactures, and commerce; house furniture, fuel, utensils, carriages, and all shipping from a yawl to a first-rate, with all minerals, which includes that universally necessary one of iron, and whatever articles of commerce which require building utensils and fuel, besides shelter for land and cattle; all these depend upon it. * * * Some means should and might be contrived and enforced to animate the nobility and gentry to increase the woods and forests of the country."

"It is said to be at least a custom, if not a law, in Franconia, that no farmer is permitted to marry until he bring proof of his having planted a fixed number of oak and walnut trees, these being esteemed essential to the commerce and good of the country. And Evelyn makes mention of an Italian nobleman who, at the birth of each child, planted 100,000 trees, which paid its fortune at marriage, without hurt or incumbrance to the family estate. Many Greek writers inform us of the solicitude in Egypt, Greece, and all ancient states, the most noted for wisdom, to propagate and preserve the wood, for or towards which their worship and sacred regard for groves were probably promoted, and many eminent Roman writers are at equal pains upon the same subject. Thus all ages and countries have put a high estimate upon this article. Let us emulate their virtue."

It was therefore proposed to promote the planting of timber trees as a means of providing for our navy, but also of converting the barren mountain and the swamp alike into productive areas, thereby rendering them a source of shelter in some cases to cattle, and in others conducing to the production of pasturage, thereby increasing our food supply, as well as our home comforts. The extent to which the Society was successful in promoting the planting of timber and improving agriculture is indicated by the following statement in the Society's Transactions, in reference to the estate of Mr. Thomas Johnes, of Hafod, in Cardiganshire—"The improvement of the farms and fertilising the waste grounds takes place every year. The number of trees planted on Hafod estate between October 1795 and April 1801, amounted to 2,065,000 of which 1,200,000 were larches; that besides the above trees, 55 acres of land have been sown with acorns or planted with oaks, and Mr. Johnes was still extending his

plantations." And I find it subsequently stated that he had raised 922,000 oaks; and, again, "in addition to timber land, Mr. Johnes, of Hafod, improved the breed of cows, by importing above forty from Holland. He has refuted the erroneous notion that varieties of cheeses could not be produced on the same land. His dairy furnishes him with the kinds so nearly resembling Parmesan, Stilton, Gloucester, Lancashire, Cheshire, and so excellent in quality, as not to be distinguished in form or taste from those his are intended to imitate. He has cultivated upon an extensive scale wheat, barley, rye, potatoes, and yams, and his crops have been equal to those of the southern counties of England. When we consider his exertions, we reflect with pleasure on what may be done by individuals for the general service of mankind."

The production of the oak was an especial object of the Society's attention, and the planting of acorns was carried to a great extent, many gold medals having been awarded to noblemen and gentlemen for raising that timber, among whom were the Earl of Wilton, Lord Paget, the Marquis of Tichfield, J. Morse, Esq., J. C. Curwen, Esq., and others. The ash, for planting which the Bishop of Landaff received the gold medal, Scotch fir, larch, horse chestnut, and many quick growing trees for domestic use were also cultivated. John Hutton, Esq., of Marske, in the county of York, between 1st October, 1799, and 1st April, 1801, planted on fourteen acres of land the following number of trees:—Oak, 5,400; larch, 7,300; Scotch firs, 5,700; spruce firs, 4,500; beech, 5,200; sycamore, 3,500; elms, 4,500; ashes, 5,800; birches, 1,600; alders, 2,000; mountain ash, 2,000; silver fir, 800.

FRUIT TREES.

Fruit trees, their culture and treatment, with a view to improving the fruit harvest of the country, and the subsequent utilisation of some of the products, occupied much attention, and there are many interesting records in the Transactions; but probably none will be of more general interest to members at the present time than the accounts which may be found in vols. xvii. and xx., relative to the planting and culture of the celebrated grape vine at Hampton-court, from which account you will find that in "1798 it occupied a house of 72 feet long by 18 feet over, making an area of 1,300 feet superficial of glass, under which there are more than 1,800 bunches of grapes, all from one stem. The vine was planted in 1770, and a new and larger house was built for it in 1802."

It was estimated in 1796 that the orchards of Great Britain covered an area of 300,000 acres, and the gold medal was awarded to Mr. T. S. D. Bucknall, by whose extension of observations on orcharding it was estimated the country had been benefited to the extent of £300,000 per annum.

RECLAMATION OF LAND.

Land was also reclaimed to a vast extent throughout the country, but this in most cases was the result of a combination of capital, enterprise, and skill, although many instances of individual exertion in this direction might be pointed out. In 1804 the Society awarded to William Pearce, of Turf-house, in the parish of Landewedwack, near Helston, in Cornwall, the silver medal and £15; and in reference to this award Lieutenant Thomas Humphries, R.N., says:—"I yesterday took a walk of about two miles from this station, to satisfy myself respecting a remarkable instance of persevering and indefatigable industry which I had heard of, and found as follows. Twelve acres of barren downs had been taken from the common, seven or eight of which were in a high state of cultivation, and the remainder in a very forward state of improvement. In order to vary, as needful, the different kinds of produce, this space was divided into eight different fields, which required seventeen fences; the greater part was made with stone, and put together in a masterly manner; but a great part of this industry is

hid, for most of the downs being swampy ground, and some very shallow, in order to remove the first inconvenience, the different fields were obliged to be intersected with various drains, which empty themselves into the ditches that have been obliged to be dug round the margin of each field; both for this purpose and in order to give greater height to the fences on each side of every bank, ditches are dug, and in the gateway bridges are made, able to support a loaded cart, that the water may freely run off. The land produced, in 1803, ten Cornish bushels of barley, nine trusses of hay, two hogsheads of oats, and ten bushels of wheat, besides pasture for cattle. This has been the work of eighteen years' time, by one indefatigable man, who began it in the fiftieth year of his age. I have to add that his dwelling-house and outbuildings, including the turf walls, of which they are composed, the laying of the rafters, and the thatching, are all executed by himself, though he was only bred to husbandry. His industry is surpassing, as, independent of his great labour in procuring manure from a distance, which has required his travelling 200 miles, he brings coals for different persons, of whom I am one. The distance from me is eleven miles. He has brought coals so far on my account eight times since last July, which adds 176 miles more. The ground he is improving is the property of Sir Christopher Hawkins; and, though labouring under a natural infirmity in the hand, which obliges him to conduct the plough with one hand only, yet he continues indefatigable in his exertions."

So recently as the year 1838, the Society published a full account of the result of Mr. Joseph Glynn's efforts in applying steam power to the drainage of fens, chiefly in Lincolnshire and Cambridgeshire, where, by twelve engines of the aggregate power of 580 horses, he removed the surface water of 90,000 acres; and, it is stated, "the time is probably not far distant when all the fen lands in the kingdom shall be enabled to exert their native exuberant fertility, and thus add another triumph to the many already gained on land and on sea by the matchless product of mechanical genius."

Nor did the Society's efforts cease when it had improved agriculture, induced the planting of timber, and the reclamation of waste lands. It sought to improve the condition of the agricultural labourer, and with this object encouraged bee keeping, and the construction of hives, as affording profitable occupation, at little cost, to the farm labourer and cottager, as well as increasing the supply of wax for the use of those more fortunately situated in towns and cities.

The importance of agricultural statistics occupied the attention of the Society as early as 1759. A correspondent proposed it as a means of "regulating the export, and preventing the poor of this country suffering the miserable calamities from the want of corn, which have been so great that the most obdurate heart must melt at the bare recital of woes too shocking to see."

Veterinary colleges, for the treatment of the diseases of cattle, were also suggested; and in the preface to Vol. VII. of the Transactions it is stated, "Schools have been established in different parts of Europe, wherein the disorders of sheep, cattle, and horses are particularly attended to; and perhaps few things would be of more public advantage than the ascertaining with precision the nature of the diseases to which animals, so useful to man, are liable, and thereby deducing a rational method of cure."

The best means of fattening fowls, ducks, and geese, as a substitute for butchers' meat—"the foundation of disorders"—was another subject attended to.

In reference to the machinery of agriculture we find the Society inviting the production of reaping and threshing machines; and at a later period it is stated the introduction of the latter has been the means of saving many crops of valuable corn in Great Britain, by affording quicker despatch to the separation of the corn from the wet sheaf in bad seasons.

It is stated, in the minutes of the Agricultural Committee, 26th December, 1764, that a machine for reaping corn, by Robert Ainslie, of Welnage, was worked last harvest.

The harvesting of hay, and, at a later date, corn, in unpropitious seasons, were subjects for which premiums were offered, as objects peculiarly interesting to mankind in general, and more particularly so to this kingdom:—

"The advantages that would arise to the public by the discovery of a method of making hay in wet seasons, and the benefit of such a discovery is universally allowed (see preface to Vol. X. of the Transactions), and, however difficult it may appear, yet in an age of improvement, such as the present, it seems remarkably strange that the means of gathering in the produce of the earth in unfavourable weather, however necessary and important it may be in this climate, has hardly been attended to. It is therefore hoped that the hint here given will stimulate ingenious persons to attempt the discovery of what, when known, would be of universal benefit to all countries subject to such variations of climate as we live in."

It is curious that this subject, which has just been so well treated in the able essay of Mr. Gibbs, for which the Society awarded its gold medal last session, had occupied its attention at so early a period.

Nor did the Society cease its action here; it attempted to induce the production of other crops, as a means of supplying raw materials to our manufacturers. The growth of madder was encouraged. It is thus referred to in the first report, read by Mr. Shipley to the Society:—"Madder, for the use of dyers, was formerly cultivated in England, but for many years past has been totally neglected here, and purchased abroad at the expense of £150,000 per annum. It is now again, by the encouragement of this Society, planted by some persons in this kingdom, and, by the most skilful judges, has been reported to be as good and as well cured as any foreign madder. And as thereby much advantage may accrue, both to the public and the planter, if due assistance be given, it is hoped that all who shall have occasion for madder will prefer that of their own country if they find it equally good; and by such encouragement great numbers of people will soon be induced to plant enough to supply your home consumption."

It was sought to increase the production in this country of hemp, as an indispensable material for sails or cordage both on ships of war and trading vessels, as it was absolutely requisite both for our defence and trade.

The culture of silk had been attempted in this country on many occasions, and in 1786 the Society was evidently anxious to promote the growth of the mulberry tree, and to encourage the production of silk here.

"The silkworm,"* says the Hon. Daines Barrington, seems to have come originally from Asia, but not the most southern or even tropical climates of that part of the globe. The greatest quantity of Chinese silk is made in the neighbourhood of Nanquin. Both extreme heat and thunderstorms are said to be very prejudicial to this insect. It was first introduced into Sicily and Calabria in the 13th century, and into France by Henry IV., who began the trial in Languedoc, which answered so well that James I. made the same laudable attempt in England. This king therefore issued a proclamation, in the sixth year of his reign, for the encouragement of planting mulberries, which held forth the example of France, and was directed to be read at the quarter sessions. As the introduction of such new culture must necessarily require every sort of protection for a considerable number of years, it is not extraordinary that it should not have been established, on account of the turbulency in the latter part of James's reign, and the greater troubles in that of his successor, Charles the First, who did not entirely neglect the project, but, in 1628, appointed

* Vol. II., Transactions, p. 173.

Walter Lord Aston to be keeper of the garden, mulberry trees, and silkworms near St. James's. The proposal having, therefore, not at this time succeeded, by no means furnishes a conclusive proof against its practicability; but, on the contrary, it is evident, by the before said proclamation, that both the king and his privy council conceived that it might be carried into execution."

Chelsea, so famous for her pottery and other industries, was the spot selected for trying the experiment of silk production in England, in the reign of George I.; and that monarch having granted a patent for its encouragement, two thousand mulberry trees were there planted. Miss Henrietta Rhodes, of Carne Hall, Bridgnorth, and the Rev. Mr. Swaine, of Pucklechurch, near Bristol were actively pursuing experiments in this direction about 1785-6; while so recently as 1835, Mrs. Whitby, of Newlands, Lymington, Hampshire, imported from Turin 100 standard trees and 1,000 dwarf mulberry plants.

In drawing this section of my paper to a close, I must refer to a letter, dated 7th August, 1755, received from Mr. Charles Powell, (he having previously proposed to the Society the establishment of branch societies throughout the country), which says—"A branch Society of Arts has been established in Brecknockshire; it already consists of 52 members." . . . "Such a society formed in every county, I may venture to affirm, would make this, not excepting China, one of the most flourishing kingdoms in the world, as it would draw the attention of the nobility and gentry, now too much dissipated in idle and expensive diversions, such as cocking, horse-racing, and gaming, &c., to objects truly worthy of it, the encouraging and establishing manufactures, and the promoting improvements in husbandry, and consequently exciting an honest spirit of industry and laudable emulation among the lower class of our fellow creatures, and at the same time extirpating those banes of society, idleness, party rage, and narrow-mindedness, and, in lieu thereof, cultivate a true public spirit—a spirit of universal benevolence. Such a scheme well formed and carried steadily into execution, would not only improve our estates, but open our hearts and enlarge our understandings; in short, make us good Christians, good subjects and good citizens."

"If such an undertaking was once formed, and if each county was to transmit yearly an abstract of their principal transactions to the National Society, in Craig's-court, in order to be digested and published, it would create a great spirit of emulation, and might be the means of carrying the whole into greater perfection; and every obscure, uncivilised, and uncultivated corner in the kingdom, and many there are such, would soon feel the good effects of it."

"Mr. Addison justly observes 'that zeal for the public good is the characteristic of a man of honour and a gentleman, and must take place of pleasures, profits, and all other private gratifications, that whoever wants this motive is an open enemy or an inglorious neuter to mankind, in porportion to the mis-applied advantages with which nature and fortune have blessed him.'"

I may add that many of the county agricultural societies now existing grew out of the proposition here given; many of them, no doubt, have been modified, others died and were re-created, but the work begun by the Society in the field of agriculture is still bearing fruit and adding daily to the comforts and happiness of the people of this country. The Society's efforts in reference to agriculture were watched by all classes, and some years after the date of Mr. Powell's letter, I find a long and interesting communication printed in vol. xvii. of the "Transactions, in which it is stated that—"In 1798 the thanks of the Society were voted to Nathaniel Kent, Esq., for his communication on farms in the Great Park at Windsor, and he was desired to make the due acknowledgments of the Society to His Majesty for having been graciously pleased to permit so full an account of the improvements on the farm in the

Great Park at Windsor to be sent to the Society, whereby so much benefit is likely to accrue to the public."

Mr. Kent's statement, in reference to the farms, is as follows:—

"In 1791 the Great Park at Windsor, about 4,000 acres, fell into His Majesty's possession. About 1,000 acres were separated from the rest at one extremity, and formed what is called the Norfolk Farm; about 400 acres more, at the other extremity, of a good loamy soil, were separated, and called the Flemish Farm; both being named from the nature of the husbandry meant to be adopted upon them. The rest, about 2,400 acres, remains still a plantation and park. The objects his Majesty had in view in adopting the farming system on so large a scale, I conceive, were chiefly to create labour for the industrious poor in the neighbourhood, and for trying experiments in agriculture to excite imitation where success might encourage it."

About the same date as the King's farms were established at Windsor, the Society offered, in 1799, their "gold medal to those persons of rank and opulence who shall contribute to the comfort of such the labouring poor by the erection of cottages for their dwellings, and allotting a quantity of land for their accommodation."

We will now proceed to look at what the Society did for the trade and commerce of the country.

TRADE AND COMMERCE.

The Society, at its formation, limited competition for its premiums to residents in England, the colonies, and British possessions. Its reason for so doing was that, both in Ireland and Scotland, societies were established with objects analogous to its own, and though for a time each Society worked within its own field, after a few years the Society's premiums were thrown open to the United Kingdom.

The importance of the colonies to England early invited attention, and Dr. Gardener, of South Carolina, in a letter addressed to the Society, under date 20th April, 1755, urged the introduction of machinery into the colonies. "The land is entirely tilled by the hoe, and the rice planted by the hands of slaves; but the worst comes last, for, after the rice is thrashed they beat it all in the hand in large wooden mortars, to so clear it from the husk, which is a very hard and severe operation, as each slave is tasked at seven mortars for one day, and each mortar contains three pecks of rice."

Sir Charles Whitworth, to whom Dr. Gardener's letter was sent by the secretary, remarks in reply:—"I entirely agree with him that many articles may be produced in our colonies beneficial to them as well as Great Britain, and dare say we may procure from their climate and situation what we have from China, Italy, and Spain—I mean as to wine, silk, and cochineal—which would enable us to trade with our own people to mutual advantage, and certain balance of coin with the rest of the world. Neither need we be so solicitous as to war or peace, nor so careful as to articles of commerce; and, from their distance, it may be a nursery for seamen as well as employment for our shipping. For my own part I shall not be wanting in the winter to set forth the proper matters your friend has mentioned, and dare say premiums will be readily given."

It is gratifying to be able to state that the first rice machinery was suggested and introduced into the Island of Ceylon by a vice-president of this Society, Thomas Hobbyn, Esq., for whom the late Mr. Henry Maudslay, of Lambeth, constructed a mill for the decortication of rice. The machine was introduced and used in the Island of Ceylon in 1815. His machinery for hulling rice was soon extensively adopted. Mr. Hobbyn, the same year, received the thanks of the Society for his communication respecting a hydro-mechanical press for extracting oil from cocoa nuts, and to that gentleman this country is indebted for the addition of that article to the list of commercial products brought into this country for daily consumption.

Attention was soon directed to the British possessions in America, and a proposal made by that truly great man, Benjamin Franklin, bearing date Philadelphia, 14th May, 1753, was among the earliest of the communications received. I feel sure that it will interest you. It is headed—

“A Proposal for Promoting Useful Knowledge among the British Plantations in America.

“The English are possessed of a long tract of continent, from Nova Scotia to Georgia, extending north and south through different climates, having different soils, producing different forest plants, mines, and minerals, and capable of different improvements, manufactures, &c.

“The first drudgery of settling new colonies, which confines the attention of peoples to mere necessities, is now pretty well over, and there are many in every province in circumstances that set them at ease, and afford leisure to cultivate the finer arts, and improve the common stock of knowledge. To such of these who are men of speculation, many hints must from time to time arise, many observations occur which, if well examined, pursued, and improved, might produce discoveries to the advantage of some or all of the British plantations, or to the benefit of mankind in general.”

The Society readily entertained the views advanced by Franklin, and, in 1755, elected him a corresponding member of the Society; and, in acknowledging the letter containing the announcement of that fact, he says:—

“But though you do not require your correspondents to bear any part of your expense, you will, I hope, permit me to throw my mite into your fund, and accept of twenty guineas I purpose to send you shortly, to be applied in premiums for some improvements in Britain, as a grateful, though small, return for your most kind and generous intention of encouraging improvements in America.

“I flatter myself, from that part of your plan, that those jealousies of her colonies which were formerly entertained by the mother country begin to subside. I once wrote a little paper, tending to show that such jealousies, with regard to manufactures, were ill founded. * * * Never be discouraged by any apprehension that arts are come to such perfection in England as to be incapable of further improvement. As yet, the quantity of human knowledge bears no proportion to the quantity of human ignorance.

“The improvements made within these 2,000 years, considerable as they are, would have been much more so if the ancients had possessed one or two arts now in common use. I mean those of copper plates and letter printing. Whatever is now exactly delineated and described by these can scarcely (from the multitude of copies) be lost to posterity. And the knowledge of small matters gives the hint, and is sometimes the occasion of great discoveries, perhaps ages after.”

The Society entered into correspondence with residents in Pennsylvania, Georgia, South Carolina, Canada, &c., and offered large and numerous premiums for the introduction and culture of the vine, the mulberry tree, and culture of silk, the growth and preparation of hemp and flax, the make of potash, the importation of sturgeon, and many other matters. The government of the colonies in some instances took up the Society's suggestions and supported it in its works, and votes of thanks were passed to the Society for its endeavours to promote the interests of the colonies and the mother country. The value of the hemp imported into England in 1766 amounted to £1,300,000 per annum, in addition to the foreign manufactured linen, which, notwithstanding the heavy duty, amounted to 32,000,000 yards yearly. The price of the raw material in England had risen at the same date 50 per cent., owing to a combination on the part of merchants in Russia, Poland, Prussia, and Holland. It was hoped to destroy the efficiency of the English navy and cripple our trade by limiting our supply of so important an article. To meet this difficulty, it was sought

to produce our necessary supplies in America. The Society voted many hundreds of pounds for its encouragement, and the Government passed a Bill granting bounties for its importation. These bounties extended over a period of 21 years, and were at the rate of £8 per ton for the first seven years, £6 per ton for the second seven, and £4 per ton for the last period. The seed of a large species of hemp was obtained from China, and reported upon by the Society, and the East India Company sent Mr. Sinclair out to India to establish the culture of it there; the cost of this experiment was between 10,000 and 20,000 rupees. Dr. Roxburgh also proposed many substitutes for hemp.

The Society also directed much attention to the encouragement and culture of spices in the British possessions. The cinnamon tree was introduced into Jamaica, the nutmeg plant into St. Vincent, the clove tree into Trinidad, the bread-fruit tree was introduced into the West Indies, and the culture of the mango tree into the island of Barbadoes.

In 1821 the Society directed attention to the wool-producing capabilities of New South Wales, at which date 40,000 persons had settled in that colony, and 16,000,000 lbs. of wool were imported yearly from Spain and Saxony. Nor was the trade of this country improved merely by encouraging production in our colonies and possessions abroad. The Society directed attention to such imports as were capable of discovery, manufacture, and culture at home. Thus cobalt was discovered in Cornwall, buff leather and its manufacture improved, copper and brass vessels were tinned, and hemp, flax, and madder were cultivated for the use of our manufacturers. Saw mills were erected, our fish supply improved, and the curing of fish for our own markets encouraged. Upon the fish trade the Society expended many thousands of pounds, and succeeded in establishing a regular supply to the London markets.

MANUFACTURES.

In manufacturing machines and tools the Society induced great and repeated improvements. Among the earliest were spinning-wheels and machines for winding, doubling, and twisting linen, cotton, and worsted yarn, and also a very extraordinary improvement in the loom itself, the general intention in all these machines being to shorten labour, increase produce, and save expense.

“It is no improbable conjecture,” says the editor of the Society's ‘Transactions,’ “that the great improvements in spinning which have taken place within twenty years in these kingdoms, particularly in the cotton works in Lancashire, Derbyshire, Nottinghamshire, &c., are to be assigned to the premiums offered and paid by this Society.

“In the year 1760 premiums were first offered for the best invention of a machine for spinning six threads of wool, cotton, flax, or silk at one time, and that will require but one person to work and attend it, and in 1764 some premiums were paid for attempts at obtaining that desirable object. At the time, therefore, of the first offering of rewards on this subject, there seems reason to believe the thought had not occurred to manufacturers in general; for from the best information hitherto obtained, it appears that about the year 1764 a poor man of the name of Hargreaves, employed in the cotton manufactory, near Blackburn, in Lancashire, first made one in that county, which spun eleven threads, and in the year 1770 he obtained a patent for the invention. The construction of this kind of machine, called a spinning jenny, has since been much improved, and is now at so high a degree of perfection that one woman is thereby enabled with ease to spin a hundred threads of cotton at a time; nor did the spirit and ingenuity of the manufacturers in this extensive branch stop here, for since that period those stupendous works, the cotton mills at Crumford, in Derbyshire, and several other places, have been erected, where, by the

motion of a large water-wheel, the cotton is carded, roved, and spun into threads infinitely more expeditiously and with greater truth than can possibly be done by hand, and better adapted to the general purposes of the manufacturers."

"Of how great advantages these contrivances have been to the trade at Manchester, and the country many miles round it, and, by laying the foundation of a very extended commerce, to the kingdom in general, is so well known, as to render a further detail unnecessary.

"The art of calico-printing was, for many years after the foundation of the Society, in an exceedingly imperfect and rude state, and the Society attempted to improve both the colours used and the mode of using them, as well as to obtain more perfect means of dyeing cotton of a permanent red colour.

"The mode of printing and dyeing in the East was fully detailed by *Cœur Doux*, M. Poivre and others, in a communication received from Mr. Alexander Anderson, of the Botanic Gardens, St. Vincent, and published in vols. xxi. and xxiii. of the "Transactions," where it is stated that the dyeing was better done at Madras. The printing of calicos was there effected by means of blocks, or types of burnt clay or porcelain.

"The greatest improvement in the loom, prior to the introduction of the French loom, by M. Jacquard, was the substitution of mechanical action for the drawboy, by Mr. Duff, in 1807 (rewarded by the Society), but this invention was brought to its greatest perfection about 1822-3, about the time when, owing to the continuance of peace, intercourse between France and England enabled the manufacturers of the two countries to become acquainted with the machinery and processes employed by each other. It was soon discovered that the French had been for some years in possession of a loom by M. Jacquard, which was almost as superior to the English drawboy as that was better than the living agent which it had superseded. The first person in England who took advantage of this discovery was Mr. Stephen Wilson, an eminent manufacturer of London, to whose disinterested enterprise and exertions the country is much indebted, from the circumstance that the greater height of the French loom, as compared with the English, required new and lofty buildings to be erected for its introduction.

"The requisite expense to make the experiment was, nevertheless, hazarded by Mr. Wilson, and the result, as regards the general benefit of the trade, fully justified his expectations; so complete, indeed, has been its success, that in a few years the old drawboy will probably be unknown.

"The objection to the height of the Jacquard loom was soon overcome by improvements introduced by Mr. Jennings, who reduced its height so as to admit of its being placed in the ordinary English work-rooms."

It is not generally known, but it nevertheless appears to be a fact, that the idea of printing fabrics by machinery originated with Dr. Charles Taylor, who was for sixteen years secretary of this Society. Dr. Taylor, in early life, was engaged in the business of calico printing, at a time when, by the concurrent application of chemical and mechanical knowledge to the manufacture of cotton goods, the first impulse was given which has since carried this branch of our national industry to its present almost incredible magnitude. So active was Dr. Taylor in the application of the discoveries of Berthollet, that he also was the first person who produced for sale in the Manchester market an entire piece of calico bleached by oxymuriatic acid.

The straw plait trade is another of the industries which the Society may be said to have created in this country for the benefit of the working classes. Mr. Corston taught the art in his school at Fincham, in Norfolk, and was rewarded by the Society. Similar action was induced at Luton, and a knowledge of the art soon spread to other towns; those who may desire to read the history and progress of the straw plait trade will find it

ably given in a paper read before the Society, by Mr. Tansley, in 1860.*

On May 20, 1800, a complete and valuable communication was forwarded by Mr. John Taylor, of Leipzig, to his father, Dr. Charles Taylor, the secretary of the Society, and by him communicated to the Society, on the culture of the beet plant, the application of its leaves as food for cattle, of its root for making sugar, of its syrup as yielding molasses and ardent spirit, and of its residue for other useful purposes. The communication was accompanied with samples.

I need hardly remind you how important a manufacture this has since become on the Continent, or that last year the subject was again brought before the Society, and discussed in this room with a view to promoting the establishment of a similar manufacture in this country.

Chickoree, now so largely used in this country, was introduced from Germany, as a substitute for coffee, in 1800. For the knowledge of its uses there, and the methods employed in preparing its roots, we are indebted to the same gentleman.†

Whale, seal, and fish oils were sought to be obtained in larger quantities, for home consumption, and many rewards were given, but the oil obtained was for a long time so fetid, that a reward of £100 was offered for a means of edulcorating fish oil.

With reference to the award of this prize, Mr. Robert Dossie corresponded, for some length of time, through friends; and it was not till after the award of £100 for the edulcoration of fish oils had been made that the Society became aware who was the inventor of the process. The process consisted in mixing powdered chalk with the oil, then adding water, and afterwards throwing in a small quantity of salt or pearl ash, after which more water was added, which carried the chalk with it to the bottom of the vessel, leaving the oil bright and sweet.

At a later date, on 13th March, 1810, Mr. B. Cook supplied the Society with specimens of asphaltum and substitutes for oil of turpentine, made from pit coal, also varnish prepared from these articles. Now we have petroleum. A full account of Mr. Cook's method of distilling the coal, and the products obtained, is published in the 28th vol. of the Society's "Transactions."

The making of point lace was encouraged as an employment for young English women of very small fortunes as suited to the industry and genius of that class during the low interest of money. Dorothy Holt, who proposed its introduction, says:—"The desired success has, as far as can be expected, crowned my endeavours in my promotion of the English point lace, for his Majesty (George III.) had the goodness to wear the first pair of ruffles made of it at his coronation, and more also to express that it is the natural inclination of his heart to set a high value on every endeavour to improve any English manufactures. The price paid was 25 guineas."

With regard to clocks and watches, it is impossible for me to attempt to point out what the Society did in the way of rewarding and inducing improvements in the construction of horological instruments; but this I may say, that any person who would attempt to write the history of invention in relation to clocks and watches within the past 100 years would omit much original information if he failed to search the Society's records.

Millstones, and the invention of hand-mills for grinding corn, formed an important item in the Society's early action; and the hand-mills which were constructed and sent in in competition for premiums constituted the first mechanical exhibition held by this Society.

The cranes used on our public quays were of so rude and imperfect a construction, and accidents were so constantly occurring, that the Society offered premiums for their improvement, and ultimately set up, in 1785, a crane, invented by Mr. Pinchbeck, on one of the quays

* See vol. ix., page 69, of the Society's *Journal*.

† See *Transactions*, vol. xix., page 242.

below London-bridge, of which it is recorded, "that although it answered well the purpose it was designed for, yet, from that unaccountable inattention to their safety which is daily seen among labouring people, it has been suffered totally to fall into ruin." Many rewards were subsequently given for improvements in this important mechanical aid to manual labour.

Crucibles and melting-pots were successfully made of plumbago in England, at the suggestion and under the fostering care of the Society.

The screw-jack, by Abram Staghall, now so universally in use, under a patent of modern date, was rewarded and published in 1777.

The pile-driving machine was brought from Austria by Mr. John Nepomuc Blanck, of the town of Waldsee, in Upper Austria. It is thus described:—"The method of driving piles for bridges and several other purposes, whereby eight men can do the work of 80 by any other method hitherto practised. The rammer may be twelve or, in some cases, twenty cwt., and is set going by two hooks, one of which draws up and the other lets down of itself, or also in another manner, by which the rammer claps and loosens itself without altering the motion of the main wheel." Four such machines were successfully employed in the year 1769, by order of the Emperor of Germany, and two in the year 1770, by order of the King of France, and the inventor was rewarded by both.

In 1800, the Duke of Bridgewater, as the father of inland navigation, received the gold medal for his past exertions in the construction of an underground inclined plane at Walkden Moor, in Lancashire, and his immense extent of navigation without a lock. At the same date his Grace communicated, through the Rev. Francis H. Egerton, an account of the erection of a steam-house for forcing vegetables; and in the year following the thanks of the Society were voted to him for his model of a drain plough.

In an early prospectus of the Society its object is thus set forward:—"It is to be remembered that the establishment of this Society is not on narrow views or selfish interests; the grand object of the Society is the public good. The view it held in reference to mechanical inventions was that it is not sufficient that they will succeed with care; it is also necessary that no additional trouble shall arise to the servants about them, otherwise the best inventions will be liable to miscarry.

In 1798, Mr. Sievers, a corresponding member, resident at Bauenhoff, in Livonia, writing upon the rearing and treatment of silkworms in the northern parts of Europe, referring to the influence of the Society out of England, says—"that the late Empress of Russia, whose greatness of mind was apparent in all her conduct, having seen one of the Books of Premiums annually published, established a society similar to this in her dominions, which still exists, and has been attended with great advantage."

While, however, the Society had been directing attention to such matters as I have named, both at home and abroad, other great agencies for the improvement of the condition of the people, and the industries and commerce of the country, had been at work; and foremost in time, and probably not inferior to any in the degree in which they have contributed to the national prosperity, may be placed those introduced by the Duke of Bridgewater. A brook which falls into the Mersey between Warrington and Liverpool had been rendered navigable for a few miles by deepening the channel, by cutting across the most excursive of its windings, and by erecting at its mouth a flood-gate, for the purpose of retaining the tide water. The hint thus afforded was soon appropriated by his Grace, who in the year 1757 commenced the execution of a canal for the purpose of conveying coals from his estate at Worsley to the town of Manchester. The subterranean termination of this work, in the very heart of the colliery, affords the first example of tunneling as applied to navigable canals. Its success soon led to the construction of the Bridgewater-canal,

under Brindley; this opened up an easy communication between Manchester and Liverpool, and gave rise to a system of internal navigation all over the country.

The mineral treasures of coal and limestone now began to lend their aid in affording to the people the indispensable comforts of life; the manufactures which occasioned the greatest consumption of fuel, and required the cheapest carriage, those namely of iron, glass, and pottery, soon established themselves on this island. The same district which had been the first to benefit by canals was also destined to be the seat of our cotton manufactures. Early in the 17th century, the muslins, chintzes, and delicate cotton fabrics of the East Indies had begun in some degree to be superseded by the fine linens of Flanders and the silks of Italy. The cultivation of the cotton plant had been introduced into our American and West Indian colonies. The port of Liverpool, by means of its connection with America and the West Indies, received a large proportion of the produce, and it was disposed of chiefly at Manchester.

To the discovery by Dr. Black, of the theory of latent heat, in 1764, we are indebted for the abstract principle, and to Mr. Watt for the particular application of this principle to the construction of an engine, capable of acting in any situation and of condensing in one spot the greatest possible quantity of momentum. The force of wind is irregular and intermittent; that produced by the fall of water restricted from its nature to comparatively few places; that originating in the live power of man or animals cannot be accumulated beyond a certain amount in a single effort, or be continued without rest. Following the introduction of the steam engine, the next great stride in the path of progress, was the reduction of iron ore by means of coal.

"In the year 1619, Dud Dudley, then a youth 20 years old, was fetched home from Balliol College, Oxford, to manage three iron works of his father's, in Worcestershire; but wood and charcoal growing very scanty, and pit coals abounding, he was induced to alter his furnaces and attempt the making of iron with pit coal, in which he obtained such success, that at two trials he found the quality to be good and profitable, and a patent for the invention was granted by King James I., in the nineteenth year of his reign, for the term of thirty-one years. Rival manufacturers sought to deprive Dudley of the benefit of the invention, by maintaining that the patent amounted to a monopoly, but through the influence of Edward Lord Dudley, a clause was inserted in the statute against monopolies, passed in the twenty-first year of that King, saving to Lord Dudley, for 14 years, the benefit of the patent for smelting and refining iron, and all mines and metals, by means of pit-coal, sea-coal, peat and turf.

"To those who regard with sympathy and reverence the struggles of ingenious and energetic men to overcome the hindrances by which inventive genius is so often obstructed, the 'Metallum Martis' of Dud Dudley, published in 1665, and dedicated to King Charles II., will well reward the trouble of a careful perusal. The overthrow of his works by a great flood; the opposition of rivals who disparaged his inventions, because, as he averred, he sold good iron cheaper than they could afford it; harassing attempts to induce the legislature to annul the patent as a monopoly; the destruction of his works by riotous persons; his own imprisonment on occasion of law-suits and losses; rival patentees, who wrongfully laid claim to Dudley's invention; the seizure and sale of his estate during the civil wars for his loyalty to the King; the refusal of the Privy Council to renew the patent after the Restoration—these successive misfortunes compelled Dudley to desist from the prosecution of his inventions, although he asserted that he had accomplished an eminent triplicity in making iron—first, more sufficient; secondly, more cheap; thirdly, more excellent."*

* See address of Sir Thomas Phillips, vol. IX., page 10, of the *Journal*.

Experiments in the use of pit coal were resumed at Coalbrookdale in the early part of the last century, when a furnace constructed for that purpose was erected by Mr. Abraham Darby at that place. His discoveries led the way to the extensive use of iron which is the characteristic feature of the present age. Mr. Darby was also the inventor of iron railways, many miles of which were laid down to facilitate the communication between his collieries, quarries, mines, and smelting works. He also constructed the first iron bridge, viz., that at Coalbrookdale.

Of the importance of these discoveries the Society was by no means ignorant; but as, in connection with the majority of the industries which grew out of these discoveries, patents were obtained, the Society refused to take cognisance of them, having effectually closed its doors against all patented inventions; the necessary result, as coal, iron, and the steam engine extended their influence, was that the Society lost power and position till at length it practically died out.

It is well, perhaps, that I should state that for many years after the Society was established, it was without any official organ of publication of its own. I am, therefore, unable to refer to many of the articles quoted; but, I may add, so anxious were those in power to co-operate with the Society in making known throughout the country the premiums offered by it, that the following notice was printed and issued by the Postmaster General:—

“General Post-office, May 1st, 1775.

“His Majesty’s Post-master General, being desirous of promoting the views of the Society constituted in London for the Encouragement of Arts, Manufactures, and Commerce, I send you herewith a book of their premiums, that all persons coming to your office may have an opportunity of reading it.

“I am, your assured friend,

“ANTHONY TODD, Secretary.”

The main object the Society sought to attain was to incite the inhabitants of the country to excel in the arts and sciences, the surest method by which nations emerge from poverty and ignorance to esteem, wealth and grandeur. By well-timed endeavours to increase the products of our soil, and also of the soil of other countries, it was hoped not only to give bread to the poor and indigent, but to increase the affluence of the great and the stability of the kingdom.

SECOND PERIOD—AFTER INCORPORATION.

Having lingered thus long upon the past, time warns me to say but little about the present period, nor is it necessary that what is known to many present should be referred to in detail. I will therefore only state that, in 1846, the bye-laws of the Society were altered, and the management of the business of the Society was vested in the Council then first established—that a Charter of Incorporation was obtained in 1847—that the Society’s position and objects were reviewed, and prizes were instituted to promote the production of art manufactures. The prizes awarded led to exhibitions being established, which in their turn were developed into the Great Exhibition of 1851. While the Society promoted industrial exhibitions it encouraged a knowledge and love for art, by holding exhibitions of the works of British artists. It introduced new industrial reproductive art processes; it suggested to and obtained from the Government an improved Patent Law, in aid of the industries and inventive genius of the country; it advanced education by means of the union which it established in connection with the literary, scientific, and mechanics’ institutions throughout the country; it promoted amendments in the law of copyright, assisted to remove the paper duty, to improve the dwellings of the working classes, and the laws affecting their health, and to obtain an amendment of our postal system. Its exhibitions, more especially the exhibition of 1851, were

the means of securing for the nation a sum of money, with which an estate has been purchased, upon which has risen, and is rising, one of the most splendid collections of art industries the world has ever seen. In connection with that, the schools of design throughout the country are being aided and advanced by the Government, and the Society is promoting a knowledge of many industrial arts, and the creation of new art industries, by the award of art workmanship prizes, the examples for which are to be found in the South Kensington Museum. A second museum is also now in course of erection at the east end of London, towards purchasing the site for which the Society contributed £100.

I must not pass by unnoticed the fact that the exhibition of educational apparatus, the first of its kind ever held in this country, was due to the energy of that friend so recently lost to the Society, Mr. Harry Chester; nor must I omit to refer to the exhibitions of patented inventions held for several years after the institution of the new Patent Laws, which have given to the country a complete record of the patented inventions from the time of King James to the present day, with a Patent Library and Patent Museum for consultation and reference by all who seek information in relation to the inventive industries of the country. The Society, moreover, created the Exhibition of 1862, by obtaining a guarantee fund of upwards of £400,000; it nominated the Royal Commissioners who conducted the Exhibition, and applied to and obtained from the Government the Charter under which they were incorporated.

The result of that second International Exhibition was to make known the great advances which the workmen of England had made in art since 1851, and to show them the importance of a fuller and more perfect scientific and technical training, in order to enable them to keep pace with their foreign competitors for the future. Industrial instruction and technical education have occupied the Society’s attention on several occasions, and during the past session the Council appointed a committee to consider and report as to the best means of promoting the technical education of the artisan; the Society will doubtless continue the work thus begun.

But it is not alone the artisan who needs that his knowledge should keep pace with the requirements of the times; it is even more necessary that the knowledge of the capitalist, manufacturer, and employer of skilled labour should do so; but before proceeding to the consideration of how this may best be promoted by the Society in the future, there are one or two observations which I desire to introduce here.

Firstly, the Society, as a voluntary body, is established for the promotion of such matters as may in any way be calculated to increase the welfare of the people of this country. Its funds are derived from the voluntary payments of its members, but from time to time those funds have been added to by bequests on the part of individuals who, not being members, have watched the Society’s action from without, and, approving of the results obtained, have thought fit to leave certain property in trust for the future carrying on of its work. Such bequests, in times past, were made by Mr. John Stock, Mr. Fothergill, and others; and it is a fact to be noted, that at the moment at which the Society seemed to be expiring, a bequest, by Dr. Swiney of £5,000 was made to it. The terms of his bequest have been faithfully carried out ever since, 1849, when the first prize was awarded, and it will be the duty of the Society to make another award in January, 1869.

Dr. Cantor also, in 1859, bequeathed to the Society the sum of £4,500, to be held in trust for such purposes as the Council may think best calculated to promote Arts, Manufactures, and Commerce. In discharge of this trust, the Council established what are now known as the Cantor Lectures, as a means of making known the relations of science and art to industry.

But the Society is not alone indebted to benefactors

of money. To the Noblemen and Gentlemen who have presided over it, to the Chairmen of its Council, since its incorporation, the Society owes a deep debt of gratitude for the time they have bestowed, and the labour they have incurred in carrying on its work.

It would be invidious on my part to point to any one in particular, but I feel that a list should not be omitted from this record. I append it accordingly:—

PRESIDENTS.

	Elected.
Right Hon. Jacob Viscount Folkestone	1755
Right Hon. Robert Lord Romney, LL.D., F.R.S.	1761
Charles Duke of Norfolk, F.R.S.	1794
H.R.H. The Duke of Sussex	1816
H.R.H. Prince ALBERT, K.G., LL.D., F.R.S....	1843
William Tooke, Esq., F.R.S.	1862
H.R.H. THE PRINCE OF WALES	1863

Charter dated June 10, 1847.

First Council elected under the Charter,
April 5, 1848.

George Bailey	Chairmen of the Council, April, 1848	
Edward Speer		
Edward Speer	Chairman	" 1849
Francis Fuller	Chairman	" 1850
Henry Cole	Deputy	" 1850
Henry Cole	Chairman	Dec. 1850
W. W. Saunders, F.R.S.	Chairman	" 1851
E. Solly, F.R.S.	Deputy	" 1851
Henry Cole	Chairman	July 1852
Capt. Owen, R.E.	Deputy	" 1853
Capt. Owen, R.E.	Chairman	" 1853
(Resigned Nov. 1853.)		
Harry Chester	Chairman	Nov. 1853
Viscount Ebrington	"	July 1854
Rev. James Booth, LL.D., F.R.S.,	"	" 1855
Col. W. H. Sykes, F.R.S.	"	" 1856
Rev. James Booth, LL.D., F.R.S.	"	" 1857
C. Wentworth Dilke	"	Nov. 1857
"	"	July 1858
Sir Thomas Phillips	"	" 1859
"	"	" 1860
"	"	" 1861
"	"	" 1862
W. Hawes	"	" 1863
"	"	" 1864
"	"	" 1865
Sir Thomas Phillips	"	" 1866
W. Hawes	"	" 1867

What has resulted from the joint labours of those gentlemen I have endeavoured to indicate; and, so far as the Society itself is concerned, I may add, it has never, throughout its career, added to its funds by Government grants; neither has it stored funds as a means of providing for officers who may be either wanting in energy, or disposed to fall into a false position, by talking of the dignity of societies, and waiting to be sought out by, instead of seeking out, objects deserving of promotion by the society. What has been subscribed has been spent at the time in the promotion of the objects in aid of which it was received; and in proportion to the funds placed at the disposal of the Council, will be its means of usefulness in the future.

THE FUTURE.

I will now proceed to the third portion of this paper—the future of the Society of Arts.

The Society of Arts is now presided over by His Royal Highness the Prince of Wales. Let us hope that under his presidency the Society may prosper as fully, and the work done be of as generally beneficial a character, as that performed by it during the period it was presided over by his Royal Father. In order, then, to see what our future must be, let us look back at what the Society was, and what it now is, as, by a comparison of the two, we may be enabled to judge what it ought to be.

I have endeavoured to show what was the condition of the people, and also of the country, both in relation to its natural and manufacturing capabilities, at the period at which the Society was established; and in reference to art, I have pointed to some of the steps which led to the establishment of a Royal Academy; to others, which led to the improvement of our means of reproducing art, for the improvement of the taste of the people, and extending our means of production as a commercial nation—and this in reference to the first period of the Society's existence.

Since the incorporation of the Society, I have endeavoured to indicate a few of the many acts done by it, and to show that its action, from first to last, has been in accord with the intention of its founders; and it is somewhat remarkable that the two sets of actions should have, in many cases, run so exactly parallel, and have produced results so similar.

If the first action promoted education and art, and the establishment of exhibitions of art, the second, in like manner, promoted industrial art and industrial art exhibitions, and the creation of an industrial art museum at South Kensington. The food and the education of the people have, in both alike, been looked after; while the resources of our colonies, their products, and capabilities of supplying the mother-country, have, in each case, commanded a large amount of attention, with mutual advantage both to them and to us.

At the foundation of the Society all was enthusiasm—everybody worked, and everybody thought how he could promote the good of all and the prosperity of the country. Suggestions came in from all quarters, correspondence was entered into with all parts of the world, and for a time all went well; voluntary aid was not over-taxed. The Society consisted in the first instance of a small number of members, and means of communication with distant parts and with each other, were slow and difficult, but those founders and energetic workers gradually paid the debt of nature, which all must pay, and the work of the Society was then left in less zealous hands. The members at large managed the affairs of the Society, but gradually they ceased to move with the times, or, if they did attend to the business of the Society, only proved the truth of the old adage, that what is everybody's business is nobody's business. The Society did not expand as the resources of the country did, but it kept on in one prescribed and beaten track, till it ultimately lost the position and good name which its founders had made for it.

When the second period was entered upon, the barriers to progress were thrown down; the restrictions which had kept patented inventions and their inventors from its doors were removed; the steam-engine and its appliances—which are not once mentioned as inventions of their times, and in reference to which you may search the "Transactions" of the Society in vain, if you want information upon them, were admitted; and protection was sought and obtained for all who endeavoured to carry out improvements of any kind. By a cheaper and better Patent Law, the inventions and patents of past times were unsealed for the benefit of the public by their immediate publication; and a Museum of Patents was instituted by the Commissioners of Patents, in whom the power was vested, under what I may here call the Society's Act.

Having, so to speak, set free invention, while so doing the Society developed art in its relation to manufactures, and promoted a knowledge of high art by the exhibitions which it held. It fostered a love for art in the minds of the people, by giving an artistic character to the things which were to surround them in every-day life.

It improved the education of the people, and extended the knowledge of the industries and products of the world, by establishing exhibitions in which all were permitted to appear as friendly rivals, instead of being looked upon with jealousy, and dreaded as antagonists, in the commerce and battle of every-day

life. Each country exhibiting became, in its turn, a student of the products of its competitors, and each competitor became better acquainted with the means and appliances resorted to for the production of the articles exhibited. The example thus set was soon copied by other countries, and the whole civilised world has now proclaimed, as with one voice, that all progress in the future will be due to increased knowledge, and that to attain it a sound primary and greatly extended and improved scientific education must be afforded, both to the employer and the employed, upon art, manufactures, and commerce.

What, then, I ask, should the action of the Society of Arts be in reference to the future? I feel that I am treading on delicate ground, and I desire it to be understood that what I am about to say are my own views, expressed in my own way, and for which I alone am responsible. They are in no way to be taken as a reflex of the opinions and views of the Council and my brother officers. I merely throw-out certain ideas, and if worthy of a moment's consideration, I have no doubt they will receive it; all I desire is, if possible, to advance the objects of the Society and the interests which it is established to promote.

It appears, then, to me that we have, as a nation, learnt first how to produce; secondly, what others produce, and how they produce it; and thirdly, what is necessary, if we as a nation are to continue to produce and compete successfully with the other nations of the world. Our field of knowledge is greatly enlarged; and if we are to advance in the future and develop our industries to the greatest possible extent, it can only be accomplished by the application of exact knowledge in relation to every new appliance rendered available by science, art, and mechanical invention.

How can the Society best promote this more extended and more exact knowledge? By enlisting the hearty co-operation of its members in the work. This, in my opinion, would be more successfully obtained, if some system of grouping could be adopted, which, I need hardly say, would not involve any change in the present system of management. I would venture to suggest, in the first instance, some such division as the following, each group being placed under the special care of an expert:—

Chemistry in its relation to manufactures and the arts.
Manufacturing machines and tools.

Trade and commerce, especially including colonial produce.

Education, domestic, social, and economic appliances.

Under some such divisions, an expansion of our present action might be begun; an expansion which could be elaborated from time to time as additional funds were provided; and under these divisions I believe members would naturally group themselves, and papers might be read periodically in each section.

With industry, according to a list formerly prepared for the Society, applied to nearly 1,000 trades, and the discoveries of science daily brought to bear more and more upon them, how is it possible, under our present system to watch and record progress in this country alone?

I think, also, that it would be a good and profitable investment of money to appoint gentlemen to watch and report on the progress of science and industry abroad, and to translate the records of the published discoveries made in foreign countries for the Society's *Journal* and the information of its members.

I believe that, with some such organisation as I have indicated, the Society's weekly meetings might be made of infinitely greater importance and interest to the members in general, because they would have persons constantly on the look-out for information for them—information which might be submitted in the form of reports, or as papers, as might be deemed most desirable. Again, with experts, if I may use the term, over each section,

and supplying special information for the *Journal*, that work would naturally become greatly improved in character and in the amount of information it would contain. Articles, in the nature of reviews, might be prepared in reference to the patents taken out during each prescribed period, without giving opinions as to which was best; and a railway to knowledge would thus be laid down for the use of members. Nor is this all that might be done. The information resulting from the discussions of the 57 Chambers of Commerce and the 36 Boards of Agriculture, which are established and at work in this country, might then be made available, and more detailed information in reference to our 41 colonies, and the works which are going on there, might be obtained.

Have none of the exhibitions which have been held pointed out anything worth inquiring into, or left us without knowledge as to who can afford us information for their own benefit and the country's advantage? Are there no Secretaries of Legation supplying reports to our Government, and are there no consular reports, no blue books published and possessing information of value to the Arts, Manufactures, and Commerce of this country? Is there no scientific literature? Are there no works of a technical nature ever published in our own country which ought to be read? Yes, gentlemen, there are many; and if the Society of Arts is to do its work efficiently in the future all these and more must be watched and worked.

There are, however, other things which the Society should still continue to do, and which it would then be able to do with increased effect as compared with its past action. It should watch for and record the wants of industry and art, and offer such honorary rewards for them as their importance demands. Are there no wants in the present day not yet supplied? Do we know all there is to know about metals? Can we puddle iron without a large amount of manual labour? Have we succeeded in constructing a locomotive fit to be worked, and capable of being used in underground railways without creating a nuisance or injury to health? Have we yet ascertained how to bring the surplus food supply of other countries to our own shores? Have chemists exhausted all the sources from which motive power may be supplied without nuisance, and in so safe and portable a form that horses might be dispensed with on our streets and roads, thereby adding an enormous food-producing area for the benefit of the people of this country? Have manufacturers combined with electricians to apply electricity as it is capable of being applied to increase and extend the artistic powers of the loom? Are there no new oils, gums, fibres and spices, &c., in India, Africa, and throughout Australia? Do we know how to use petroleum as it is capable of being used? Surely with experts in charge of sections, wants such as these and many others I could name might be recorded and put forward for solution; and though we may not live to see them all realized, still, when our successors shall come before the members of the Society of Arts 115 years hence, they may then have to record of them as we do now, that the reaping machine asked for one hundred years ago has been obtained and is regularly at work, and that the hay and the corn that used to be spoiled in wet seasons is now capable of being preserved and harvested for the use of man.

The Society has thrown open its doors to patents; it has explored the world by means of exhibitions; it has found that increased and increasing knowledge is needed; help the Society of Arts to help the world of industry to obtain it.

According to my view, the best mode in which the Society could do this, would be (as I said before) to divide itself into sections or groups, and for some gentleman, specially conversant with the subjects to be investigated by each section, to be appointed to work it. It would perhaps not be necessary, at all events at first, that his whole time should be occupied; but if it were made one

man's business, for instance, to obtain the best information in reference to the first division I have named (chemistry in relation to manufactures), and to bring that information before his section for discussion, much more efficient action would be the result.

We have ever been a body of volunteers, working for the good of our fellow-men. We wish to continue to be so. With an extended means of action, there will be a proportionately increasing field for volunteers to work in. Committees of investigation would crop up in each section, and members would find it to their own interest to serve on them. We started our present Society twenty-five years ago, with 300 members. We had to borrow money to pay debts, and members subscribed funds for special purposes. We did work which was appreciated by the public; the public supported us, and we are now a body of 3,000. Let us still endeavour to extend our influence; and I have no doubt that, as in times past, the seed which was sown in good ground took root, and has brought forth tenfold, those who are spared, if they work vigorously, will, in years to come be able to say it has brought forth an hundredfold.

We have passed through two periods of the Society's existence, in each of which exhibitions have formed an important feature, and museums for public instruction have been permanently established by the Government. I can foresee that if you will now enter upon the enlarged action I have endeavoured to indicate, you will not be long before you enter upon a third exhibition period. When science and art have both been brought more fully to bear upon industry, then will rise up a series of exhibitions, not one whit less important than those which have gone before; less gigantic, perhaps, in proportions, but more honest as representing the commerce, art, and industry of the country. And out of such exhibitions should grow a national museum of commercial products, such as the industries of the world are based upon, and where the traveller coming from foreign parts will be able to compare his new found product with those already known. Such a museum is now a want. The want will then have made itself felt; we shall then see Arts, Manufactures, and Commerce aided and promoted by the Government; and the technical, scientific, and artistic education of the people will thereby be advanced.

There are other ways also in which the Society can be made of greater value to the community at large. In times past, members travelling abroad watched the habits, manners, customs, and food of the people they visited; they made notes and sent suggestions to the Society. Such suggestions were at times accompanied with sums of money to be awarded as premiums for a particular line of investigation. In this way our Food Committee of the present day arose—and great good may be expected to result from its labours. Originally, however, the Trevelyan Prize was offered for the best treatise on marine algæ as an article of food. Samples were obtained from China, where they are largely used. The Society received an exceedingly valuable communication on the subject to which the prize was awarded, but the communication for a time was withdrawn, to admit of new manufacturing industries being established in this country, and which are now being carried on. The communication was subsequently submitted to the Society, and the prize was again offered in another form. Our members can, if they will, help the Society to do more of this kind of work, and while helping the Society to benefit the public, they will in many cases indirectly be benefiting themselves.

The thought will naturally arise in the minds of many, how can the Society thus expand and extend its action? How can it hold these meetings and do all these things in its present house? Gentlemen, do not refuse to do something because you do not see at once how we can do everything. The Great Exhibition of 1851 could not have been held in this building, but the Society did not therefore refuse to hold smaller exhibitions; and if

by the enlarged action I have proposed, it shall hereafter become evident that the Society requires more accommodation, I have no doubt at the proper time it will obtain it. I have already said that I believe industrial exhibitions would again grow out of such an enlarged action, and if the Society were thus expanded, it would then be able to conduct them itself, and retain them as part of its system of action, instead of handing them over to other bodies.

The Society of Arts ought to be the great industrial institution of the country, and it may become so if members will give it a full measure of support.

Allow me, in drawing this paper to a close, to say that having been permitted, by the kind consideration of the Society, to hold office now for just a quarter of a century, and having been associated since the Society's incorporation with every Council and officer that has been elected to manage its affairs, I feel confident that there never has been a period in the Society's history at which greater anxiety has been felt by all to uphold and maintain the honour of the Society and its usefulness as one of the oldest societies in this great metropolis; and, further, that so far as my present brother officers are concerned, I have never, at any period, met with greater kindness or more earnest endeavour on the part of any than I have experienced at the hands of my friends Mr. Foster and Mr. Critchett, with whom I have long had the pleasure of being associated (the former having served the Society for fifteen and the latter for twelve years); and I feel sure that the Council and members, should they think the enlarged action I have endeavoured to shadow forth worthy of being taken up, may rely, not on a lukewarm and half-hearted co-operation on the part of my colleagues, but a zealous, honest, and vigorous aid; and if my humble services can in any way aid the good cause in ever so slight a degree, I need scarcely say how glad I shall be to render them.

DISCUSSION.

Mr. VARLEY wished to add to the interesting information contained in the paper they had heard, the fact that a reward had been bestowed by the Society on Captain Manby for his most valuable invention of a mode of communicating with ships in distress from the shore, this invention being an improvement on one by Lieut. Bell for communicating from the ship to the land.

Mr. BOTLY said they were much indebted to Mr. Davenport for the elaborate history of the Society which he had placed before them, and also for the suggestions with which the paper concluded. Before referring more particularly to them, he wished to remark on one important feature in the past working of the Society, which was, that it had never accumulated funds, but had always spent them in the promotion of its objects. He was acquainted with one society which had now about £20,000 invested, but this was not the case with the Society of Arts, for whatever subscriptions it received were laid out at the time for the benefit of the public at large. With regard to the important suggestions which had been thrown out in the paper, he rather doubted whether the members at large were competent to discuss them, and he thought they had not better come before the Council, who would report upon them to the Society. He was very pleased to notice the great respect in which their Society was held at the meeting of the British Association at Norwich, and no one could travel on the Continent without becoming aware of the high estimation in which it was there held.

Mr. THOMAS WEBSTER, Q.C., F.R.S., said that all the members must feel indebted to Mr. Davenport for bringing before them such an interesting history of the Society (for the preparation of which he had facilities possessed by but few), and not less so for the valuable suggestions in the concluding part of the paper. It was

very remarkable to observe that at a very early period the Society had drawn a distinction between inventions which were the subjects of patents, and those which were not so protected, the latter alone being then considered eligible for its notice. The principle upon which this distinction was drawn was that, inasmuch as there was a special property in a patented invention, it was thought that the owner might look to that for his reward, and that the Society had better apply its influence in rewarding those inventions which had not that advantage. Experience, however, had shown that however excellent this might be in theory, the Society had done very wisely in opening its doors and recognising every useful invention, whether patented or not. It was a consideration not to be overlooked, that in proportion to the importance of any new invention was the opposition which it had to encounter, because in many cases it necessarily led to the utter removal and abandonment of existing machinery, which represented so much capital embarked in the business to which the invention referred. Capitalists therefore were generally averse to the introduction of new inventions. The recognition of patented inventions, therefore, by the Society he looked upon as a very important event in its history, and this was not accomplished without a great deal of discussion. There was a period, from about 1837 to 1844, when the very existence of the Society was only preserved by a few resolute individuals who insisted upon keeping its doors open, and upon not selling its property, and many and serious were the discussions which occurred at this time. Passing by these things, which were rather matters of history, he wished to offer a remark or two as to the suggestions made at the conclusion of the paper. He thought that some such system of grouping as had been proposed would be advantageous, and probably the three first divisions put forward were strictly within the province of the Society. The first division was chemistry in relation to arts and manufactures. Chemistry here included all those influences or operations of nature of which nothing was known except by their results; and in the next head machinery included all the combinations of existing elements of which the result could be definitely foretold from past experience. He did not think that a more comprehensive division could be made of the various applications of science to the products of industry than this. The third division, commerce, was one which had always occupied a prominent place in the Society's operations, and under this head would be considered all those restrictions, whether economic or legislative, which interfered with improvement and progress in industry. As to the fourth head or division mentioned by Mr. Davenport—education, domestic, social, and economic matters—he should hesitate a little before admitting it to a place in the scheme of the Society of Arts, as it involved some danger of turning the Society into a political union. It was very desirable that such questions should be discussed, but in his opinion they were better left to an association which had before now met in that room, the Social Science Association. The Society of Arts might fairly hold out the hand of fellowship to such societies, and assist them by any means in its power, but he thought it would be beyond its province to discuss such matters. In the course which Mr. Davenport had suggested of assigning various departments to persons specially qualified to conduct them, lay, he believed, the great future of the Society. The history of inventions was as yet very imperfect, but if in such a large body they had a number of sectional departments, each under the charge of a gentleman to experience and thorough practical knowledge, there would arise a complete record of the progress of mankind with regard to useful arts and inventions, and out of that record would spring many valuable suggestions as to the cognate subject of commerce. He, therefore, thought Mr. Davenport's suggestion highly worthy of consideration, and if the system were adopted he had no

doubt but that the Society had a great future before it.

Mr. ANTONIO BRADY desired to endorse all that had fallen from the last speaker. He thought the Society owed a debt of gratitude to Mr. Davenport for the care with which he had brought the subject before them. Probably few persons in the room were previously aware of the magnitude of the influence which, during the preceding century, the Society had exercised upon the arts and manufactures of the country. There was no doubt that if they properly fulfilled their mission they had a great future before them. He thought the proposed division which had so happily been sketched out by Mr. Davenport was an excellent proposal. It would be most valuable to inventors if all their discoveries, as they were made, instead of passing unheeded, as was now often the case, were made the subject of discussion and investigation. As a member of the Council he felt deeply indebted to Mr. Davenport for his paper. He therefore begged leave to move a cordial vote of thanks to Mr. Davenport, whom he congratulated most heartily on the success of his paper; at the same time he congratulated the Society on possessing so able an officer.

Dr. ELLIS had much pleasure in seconding the motion. As one who had long been connected with the Society, he could not help acknowledging that his feelings had been quite stirred by the interesting records he had listened to, and the important suggestions which had been thrown out for consideration. He felt that Mr. Davenport had only suggested an expansion of the original intention of the Society. When its members were but few, but few things could be done, though their minds might be large enough to embrace a wide sphere of action; but now was come the time when there seemed a possibility of carrying into effect the great ideas of their founders. He hoped there would be an immediate practical result, and that gentlemen would at once begin to consider how they could best serve the Society in the manner now suggested. He believed that many members who now knew scarcely anything of the Society's operations would be stimulated to take part in promoting the great work in which it was engaged. It was very cheering to hear that out of such small beginnings had arisen such great results; and he should impress upon all his friends throughout the kingdom the duty they owed to the Society, and he hoped all the members would not only do what they could themselves, but endeavour to enlist others in the good work.

Mr. P. L. SIMMONDS, heartily concurring in all that had been said, wished to draw attention to a subject which he had long advocated, viz., the establishment of a commercial museum in London. From a long connection with different international exhibitions, his conviction was, that it was all important to our manufactures and commerce that there should be a museum of raw materials, open to the inspection of merchants and manufacturers; and the necessity for this was now being shown in one or two special instances. The liberation of the serfs in Russia had led to the abandonment in a considerable measure of agricultural operations, and there was now a great deficiency in the supply of linseed, and, consequently, of linseed oil. It was therefore of great importance to manufacturers to know what oil could be used in its stead for various purposes, where a drying oil was required. Again, there were one or two hard resins used in making varnishes, for which substitutes were much wanted, and many other instances might be mentioned if time permitted. If a museum of raw materials were once established it would be rapidly added to from year to year by the contributions of brokers, merchants, and importers, as well as of correspondents in all parts of the world.

The CHAIRMAN, before putting the motion, in which he heartily concurred, remarked that he should have been pleased to hear the suggestions made in the

paper more freely discussed, but probably the reason this had not been the case was that most of the members present concurred, more or less, in the proposal. If they did not go quite to the full extent there suggested, he thought they might very well begin by endeavouring to secure persons capable of preparing papers which might be published, containing the cream of the various scientific articles appearing from time to time. The result would be on the one hand an immense saving of time to the readers, and on the other hand it would bring before inventors considerable amount of information which was now scattered over numerous publications in Europe and America. He agreed with the remarks of Mr. Botly, that this was a matter for the Council to take up, and as a member of that body he naturally felt some difficulty in pronouncing an opinion upon it, but he might say this, that high as was the position which the Society had of late years attained, and great as was the amount of good which it had been instrumental in performing, there was no reason why its usefulness should not be increased, and its position become still more exalted. He cordially concurred in the vote of thanks, and begged to assure the members that the suggestions thrown out would be carefully considered by the Council, when due weight would be given to all that had passed on that occasion.

The vote of thanks was then passed, and duly acknowledged by Mr. Davenport.

Proceedings of Institutions.

YORKSHIRE UNION OF MECHANICS' INSTITUTES.—*Castleford Mechanics' Institute.*—The annual *soirée* was held on Monday evening, under the presidency of the Right Hon. Lord Houghton. The secretary, Mr. G. Masterman, read the report, from which it appeared that the Institute is not in so prosperous a condition as might be wished. Lord Houghton remarked that people seldom got tired of singing, but often of speeches, however good and important the subject. He should like to see in the people of the town an increasing interest in the progress of education; he compared the present and future positions of two working men, one of whom neglected the opportunities of improvement so bountifully spread around; the other eagerly grasping and making use of them. An interval of a few years found the one occupying a higher and more honourable position in society; whereas the other remained the same. Not only that, but in case the trade he followed got bad, there was nothing but the relieving-officer and the union workhouse before him. He briefly alluded to a large meeting held in Birmingham, at which he had been present, where the principal subject was the question of compulsory education. He believed that the great mass of the working classes are in favour of it. He saw that Castleford was a great town in its infancy; and he saw no reason why it might not before long occupy an important place in this noted West Riding, if the people who inhabited it would only attend to the question of education. Addresses were also given by Mr. Austin, president, Dr. Carr, Mr. Henry H. Sales, Revs. W. J. M. Sylvester, J. Holling, J. D. Balmer, and Mr. John Cass. *Holywell-green Mechanics' Institute.*—The annual distribution of certificates, awarded by the Society of Arts, took place in the hall of the Institute, on Saturday, November 21st. Mr. J. Fisher, of Halifax, occupied the chair, and presented the certificates, accompanying each certificate with congratulation and advice to the successful candidate. An address on the past history and future work of Mechanics' Institutes was given by Mr. Henry H. Sales, who was followed by the Rev. Professor Newth, of Manchester. Short addresses were also given by Messrs. Ormerod, of Brighouse,

Bateman, of Greetland, and others. It may be noted that in this small village Institute, one of the certificates distributed was for success in Italian, and another a first class in music. A chemistry class has been established this year, and is doing well.

Correspondence.

HARVESTING PRIZE.—SIR,—As I was debarred on Monday, by custom and etiquette, from giving any adequate expression to my acknowledgments for the Gold Medal and prize, I ask the publicity of your *Journal* to convey my own thanks to the Council of the Society of Arts for the honour they have thus conferred upon me, and the thanks which I believe are due to them from the public at large, for having stimulated inquiry into one of the most important problems of the age. We are now in the excitement of a contested election, and party cries are still ringing in our ears; but there is one cry that will outlast all others—a cry that neither governments nor statesmen can ignore with impunity—the “cry of the hungry for bread.” Whatever may be promised on the hustings or performed in St. Stephen's, the Parliament of Arts and Sciences has not disregarded that cry. It is on record that the late Sir Robert Peel founded his chief claim to the gratitude of his countrymen upon the means which he had adopted for cheapening the poor man's loaf. The Society of Arts has used its influence in the same good cause, and has thereby earned a tribute of lasting gratitude from those classes of the community who most want a helping hand. The losses that a country sustains from unseasonable weather at harvest-time are enormous; the imperfect statistics on the subject show them to be so immense as to be well nigh incredible, and yet I believe those statistics are rather under than over the mark; for the farmers, notwithstanding the traditional propensity for grumbling, are a tolerably patient, and much-enduring set of men. They have come to look upon such losses as inevitable, and as the subject is a somewhat painful one, they do not care to say much about it. Now, patient endurance of losses, so long as they are inevitable, is undoubtedly a great virtue; but I much mistake the shrewd and enterprising character of the agriculturists of our day, if they will long endure to see their hay spoiled, and their corn damaged, when a means of escape from such disasters is once fairly before them. The Society of Arts has contributed largely to bring this means to their notice, and has called the attention, not alone of this country, but of Europe, to the subject; it has aroused much interest in France, Belgium, and Holland, and I am now in negotiation with men of high position in Russia and Sweden who desire to apply the new system of harvesting in those countries. The results of further experiments during this season have been eminently satisfactory, but as they will shortly be published in a third edition of my Essay, I need only state that where a steam-engine is not obtainable, horse-power may be successfully substituted for it. In Ireland, Scotland, and Wales (parts of the kingdom that stand most in need of artificial help in drying their grain and grass crops), the steam-engine is, as yet, seldom to be had, but horse-power is in very general use. The farmers of those districts will therefore be able to dry their wheat as easily as they now thresh it. To a society which takes cognisance of, and encourages manufacture, as well as art and science, it may not be uninteresting to state that the extended use of machinery in agriculture gives a new source of industry to this country. The number of farmers in the United Kingdom may be roughly estimated at 200,000; hence, if only one in twenty of that number availed themselves of this new power of dealing with their harvests, it would give a large impulse to the trade of engineering and all its

correlative branches. Thus the action that the Society has taken in this matter will have the twofold advantage of securing more food for the country, and giving more work to the town.—I am, &c., WILLIAM ALFRED GIBBS.
Gillwell-park, Sewardstone, Essex,
24th Nov., 1868.

MEETINGS FOR THE ENSUING WEEK.

- MON.**.....British Architects, 8.
Actuaries, 7. Mr. T. B. Sprague, "On the Value of Reversionary Life Interests."
Medical, 8.
Asiatic, 3.
London Inst., 6.
Social Science Assoc., 8. Dr. W. B. Richardson, "On Poor Law Reform."
TUES ...Civil Engineers, 8. Mr. W. H. Wheeler, "Description of the River Witham, and of its Estuary, and of the Works upon it."
Pathological, 8.
Anthropological, 8.
Syro-Egyptian, 7½.
WED ...Society of Arts, 8. Dr. Mann, "Further Notes on the Productive Industries of Natal."
R. Society of Literature, 4½.
Obstetrical, 8.
THUR ...Antiquaries, 8½.
Linnean, 8. 1. Dr. Moss, "On the Anatomy of the genus *Appendicularia*, with the Description of a New Species." 2. Mr. E. Saunders, "On New Species of *Paracupta* and *Conognatha*."
Chemical, 8.
FRIGeologists' Assoc., 8.
Philological, 8½.
Archæological Inst., 4.
SATArtists and Amateurs, 7. Annual Meeting.

Patents.

From Commissioners of Patents' Journal, November 20.

GRANTS OF PROVISIONAL PROTECTION.

Alcoholic liquors, producing—3323—R. Irvine.
Bobbin spools, &c.—3357—R. Cook.
Bobbins, &c., shaping wood for—3360—J. Clark.
Boilers—3292—T. Mordue.
Boilers—3344—W. R. Lake.
Boilers, &c.—3371—J. Taylor, jun.
Bolts, wrought-iron—3377—M. A. F. Mennons.
Boots and shoes—3211—J. H. Johnson.
Boots and shoes—3317—A. S. Paterson.
Bricks and tiles—3312—J. and W. Adams.
Casks, &c., washing—3284—W. E. Hickling.
Cigars—3367—C. Archer.
Cloth, &c., ironing and pressing—3338—L. Berenger.
Cotton, &c., preparing—3306—B. Dobson and J. Clough.
Dredgers—3354—T. Burt.
Electricity, generating static—3329—S. A. Varley.
Electro-physiological battery for application to the human body—3359—B. Hunt.
Engine pumps, &c.—3363—A. L. Bricknell.
Fabrics, embroidering—2938—J. F. Wanner.
Fabrics, woven—3337—J. Moore.
Fabrics, &c., furred—3349—E. T. Hughes.
Fibrous materials, spinning and doubling—3350—I. W., and J. Holt and J. Maude.
Fire alarm—3304—J. G. Tongue.
Fire-arms, &c., breech-loading—3286—J. B. O'Hea and W. Bullen.
Fæcal matters, treating and utilising—3341—S. Schuman.
Fuel economisers, &c.—3358—R. Needham.
Game, cases for packing—3343—G. F. Morant.
Garments for saving life at sea, &c.—3334—J. Dannatt and T. S. Turnbull.
Gas lights, shades for—3324—J. Brünner.
Gun barrels, &c.—3192—W. E. Newton.
Indicators for showing a rise or fall of temperature, &c.—3270—C. Harrison and R. Wilson.
Iron and steel—3313—J. Heaton.
Iron and steel—3356—T. Robinson.
Iron sheds—3339—J. A. R. Main.
Iron, &c., tiles or plates of—3288—W. D. Young.
Kitchen ranges—3379—W. Broughton.
Lace—3336—J. H. Bertie.
Lamp-posts—3321—S. Sharrock.
Lanterns—3180—A. Desbonnet.
Liquids, regulating the flow of—3294—H. J. Sanders.
Locomotive engines—3290—E. T. V. Hecke.
Looms—3310—Q. and J. Whyte.
Looms—3332—J. Lodge.
Looms—3353—S. Ward, W. Hurst, and J. Tuer.
Metallic moulds for casting metals—3298—A. Wilson.
Metals, rolling—3316—W. Brown.

Mineral substances, breaking, &c.—3123—T. B. Jordan.
Mourning hats—3322—W. E. Dando.
Nut crackers—3325—W. E. Bates and T. Dodd.
Ordnance, apparatus for discharging—3335—J. Vavasour.
Ores and minerals, treating—3316—R. Oxland.
Pistons, &c., packing—3300—G. E. Donisthorpe.
Plastering trowels—3331—S. Ault.
Pottery—3274—W. Boulton.
Printing or embossing presses—3319—J. Wright.
Pumps and fire-engines—3373—F. C. Philippon.
Railway carriages—3362—J. Corbett.
Railways—3296—M. A. Soul.
Railways, &c.—3234—C. D. Abel.
Reels or bobbins—3221—J. H. Johnson.
Scarves or neckties—3340—E. Barton.
Sewing machines—3328—A. M. Clark.
Ships' boats, raising, &c.—3320—G. Allix.
Ships, propelling, &c.—3328—B. Dickinson.
Silk, &c., treating waste—3093—J. and S. W. Varley.
Steam engines, &c.—3169—W. C. Church.
Taps or valves—3314—H. Wallwork.
Teapots, &c., non-conductors of heat for the handles of—3327—J. Langford.
Tobacco, rolling—3361—A. Reid.
Tops—3308—F. A. Blanchon.
Toy houses, &c.—3355—H. Jewitt.
Type cases, &c.—3163—R. M. Wood.
Umbrellas, &c., holders for—3351—J. B. Houghton.
War turrets, &c., working—3074—J. M. Gray.
Water-elevating engines, atmospheric—3344—A. V. Newton.
Wool-combing machines—3276—T. Speight, sen., and W. H. France.
Wool, scouring—3280—A. M. Clark.
Wool, &c., preparing—3347—E. Holden.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

Bayonets—3495—W. R. Lake.
Meteorological apparatus—3489—H. A. Bonneville.
Missiles, shape and casting of—3475—H. A. Bonneville.
River boats—3485—R. M. Boniwell.
Velocipedes—3469—C. K. Bradford.

PATENTS SEALED.

1665. C. Chapman and J. Lilley.	1715. W. H. Kent.
1676. J. Revill.	1717. J. Scoffern.
1693. C. Delafield.	1733. W. Buttery.
1695. E. Jones.	1734. I. B. Miller.
1696. J. J. Harrop & W. Corbett.	1744. H. A. Bonneville.
1697. J. Higgins.	1748. H. and G. Kearsley.
1698. J. Fletcher.	1762. J. and J. B. Palmer.
1699. E. W. De Russett.	1768. F. N. Gisborne.
1704. C. Windhausen and H. Blissing.	1781. R. Lüthy.
1705. T. J. Baker.	1866. G. Davies.
1707. E. Hunt.	2600. H. C. Ensell.
1709. F. Cameron.	2708. H. A. Bonneville.

From Commissioners of Patents' Journal, November 24.

PATENTS SEALED.

1710. F. Hargreaves and J. R. Collins.	1772. H. Griffiths and F. A. Wishart.
1711. S. A. Smith.	1777. G. T. Bousfield.
1718. J. E. Holmes.	1835. J. Ashton.
1723. H. J. Bakewell.	1838. N. Salamon.
1726. J. A. Joyner and J. H. Jenkins.	1844. C. D. Abel.
1731. T. Smedley.	1861. G. Maw.
1738. W. B. Lord.	1862. A. V. Newton.
1742. J. Dixon.	1865. H. Riviere and F. T. Baker.
1745. W. Cooper.	1902. W. H. Westwood.
1746. J. Morris.	2012. M. Gray and L. Gibson.
1747. J. Vidie.	2017. J. H. Johnson.
1751. J. Scholl.	2064. A. H. Brandon.
1753. H. and F. Bailey.	2330. R. Young.
1754. R. Fell and R. Barlow.	2392. G. Davies.
1766. T. S. Horn.	2505. M. Gray and F. Hawkins.
1769. W. Maclean.	2520. H., J. W., & R. E. Dewhurst.
1770. J. Turnbull.	2565. J. Palmer.
	2779. E. Wood.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

3117. P. A. Muntz.	3000. C. P. Coles.
2992. W. E. and J. Gray.	2991. F. Pope.
2985. G. Smith and C. Ritchie.	3004. S. Hunter.
3012. W. R. Mulley.	3021. R. Mallet.
3018. J. Whitworth.	3033. J. H. Johnson.
3084. T. W. Dodds.	3066. G. T. Bousfield.
3079. I. M. Singer.	3076. J., E. R., and T. Hollands.
3090. I. M. Singer.	

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

2896. R. A. Brooman.	3696. T. Higgins.
3124. W. Bell.	2958. J. Willcox.
3179. C. Pontifex.	2960. J. H. Johnson.